

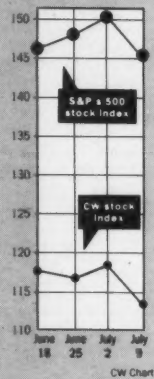
# COMPUTERWORLD

\$2/COPY; \$44/YEAR

JULY 14, 1986

VOL. XX, NO. 28

## Stock update



Stock charts in full, page 133

## Product Spotlight

Expert system shells: Automated reasoning/51

## In Depth

How to promote your next annual review/61

## TOP OF THE NEWS

**Wang Laboratories cuts** an additional 1,600 jobs, mainly through retirement incentives. **Page 134.**

**Control Data revamps** Cyber 180 line with boosted memory and lower costs. **Page 4.**

**GEISCO scraps** bank clearinghouse scheme and blasts the Fed's policies. **Page 9.**

**Hewlett-Packard HP 3000 users** are anxious to buy Spectrum models. **Page 2.**

**Computervision offers** conversion tools to aid users porting its CADDs software to workstations. **Page 19.**

**Honeywell laid off 75 employees** late last week in the manufacturing operation of its Phoenix-based Large Computer Products division. A source inside the division said some 400 additional jobs will be cut within the next two months, but a company spokeswoman denied that any further reductions are planned. The demand for Honeywell's manufacturing resources has been lowered by the firm's private labeling of NEC mainframes as its DPS 90 series.

**ADAPSO last week discarded** its controversial hardware-based lock-and-key proposal for combating micro software piracy, because of an underwhelming response from vendors and users [CW, Jan. 13]. The software trade group distributed more than 1,500 copies of the proposed standard, but fewer than 100 ballots were returned. "It is clear that interest in developing this type of technical protection standard has dwindled in the last 12 months," said Jerome L. Dreyer, ADAPSO president.

**AT&T's laptop plans** are on permanent hold, an industry source claims. The company has several prototypes under development but has no plans for introduction or production in the foreseeable future. **See NEWS page 9**

## Owners resist filing net info

Disclosure of proprietary plans feared in Utah ruling

By Elisabeth Horwitz

**SALT LAKE CITY** — Private network owners and operators are fighting a proposed state agency rule that would require businesses to disclose proprietary information about their communications facilities.

Critics claim the Utah Public Service Commission is intruding on private business and that reporting requirements would be expensive. They charge the rule would ultimately force companies to make public sensitive details regarding their internal communications systems. This would effectively provide the companies' **See OWNERS page 8**

## Lotus aims at micro-MIS data transfer

By Douglas Barney

**NEW YORK** — Marking its long-expected move from desktop dominance to an all-out assault on MIS shops, Lotus Development Corp. last week announced a line of software products that allow personal computers to extract data from a variety of mainframe applications.

The IBM mainframe-oriented modules of The Application Connection, which are enhanced versions of the Inlink products acquired from Infocenter Software, translate data from mainframe application formats to PC formats. With TAC, both the tedious job of rekeying mainframe data into PC spreadsheets and the need to write data extraction programs are eliminated, Lotus claimed. In addition, data can be uploaded into mainframe data bases and applications. **See LOTUS page 6.**

## Cobol standard add-ons played

By Charles Babcock

A committee of the American National Standards Institute this week will launch a process to add features to Cobol without waiting for another full revision of the language. If the process gathers momentum, it will cause horrendous implementation problems for compiler vendors and users, one committee member charges.

If approved, the controversial addendum procedure will allow ANSI's X3J4 committee to add features to the language more quickly than with the standard update. ANSI's Cobol 85 standard, for example, took 11 years to complete. **See COBOL page 12**

## CW SPECIAL REPORT

### Micro managers: Changing role demands business acumen

By David Bright

**M**uch as the MIS manager's role has changed in recent years, the job of microcomputer manager today is quickly evolving from that of personal computer specialist to corporate assets manager. Today, instead of simply installing one PC after another, micro managers are increasingly expected to be sensitive to the overall strategic direction of the business and to contribute to the bottom line.

For example, John Sykes, office automation manager at Lummus Crest, Inc., a Bloomfield, N.J.-based engineering and construction subsidiary of Combustion Engineering, Inc., is often called upon to participate in contract proposals that

could lead to multimillion-dollar contracts for his company.

By taking an active interest in engineering and construction as well as in end-user computing, Sykes says he is better able to help set up reports and graphics within contract proposals because he has a clearer idea of what the potential clients are looking for.

Sykes warns his peers not to fall into the shortsighted trap of concentrating on the installation of "a PC here, a printer there."

When information centers were coming into vogue three years ago, the mandate at many corporations "was really just to get an available body,"

according to Sykes.

At that time, Sykes recalls, microcomputer managers could write their own job descriptions. If a person had some technical expertise — say, a background in mainframe systems analysis — and an interest in PCs, he was in demand as a corporate PC coordinator. That is no longer the case.

Since the typical microcomputer manager has installed hundreds of corporate PCs and Lotus Development Corp. 1-2-3 packages and taught a good number of corporate personnel how to use the technology, that manager has become **See MICRO page 14**



Manager Sykes

\*\*\*\*\* S-DIGIT 48106  
V  
CJ0179526-0  
JOYCE BROWN  
UNIV MICROFILMS INTERNATL  
300 N ZEEB RD  
ANN ARBOR MI 48106

NEWSPAPER



## NEWS

# Users eager for Series 930, first HP Spectrum machine

## Survey says about 240 orders will be placed

By Maura McEnaney  
and Donna Raimondi

With less than six months to go before Hewlett-Packard Co.'s high-performance Spectrum machines head out the door, customers seem anxious for their arrival.

Since its February debut, HP's line of products based on reduced instruction set computing (RISC) architecture has garnered much interest. Although HP is keeping quiet about orders for the Series 930 — the first Spectrum machine slated to ship by year's end — early indications point to a positive user response.

"Users of the current HP 3000 line have a tremendous pent-up demand and have been waiting a long time for the new processing techniques," says Don Lewis, vice-president of information resources at Allegheny Beverage Co. in Cheverly, Md.

### Evaluating Spectrum

Allegheny has been evaluating Spectrum for use by some of its subsidiaries, among them a food and vending company, retail furniture stores, coin-operated laundromats and a building and cleaning supplies company. Allegheny now uses six HP 3000s in its telemarketing program and for office functions such as word processing and accounting.

Approximately 12% of the users of high-end HP 3000 Series 64 and 68 systems plans to acquire a Spectrum by the end of next year, according to a recent survey by Framingham, Mass.-based International Data Corp. (IDC). IDC's survey of 100 HP 3000 users also found that approximately 30% of the respondents this year will upgrade to the new HP 3000 Series 70. Announced along with the release of the first two Spectrum products in February, the Series 70 incorporates traditional HP architecture and is said to provide a 20% to 35% performance increase over the Series 68.

A 12% purchase rate means delivery of about 240 machines, and a price tag of about \$225,000 translates into more than \$54 million in sales, all of which should boost HP's bottom line.

But some observers are skeptical about the number of projected Spectrum orders. "That's a significant number of machines," notes consultant Omri Serlin of Itom International Co. in Los Gatos, Calif. "In view of the fact the machine isn't going to ship until December, I don't see why so many people would commit at this point."

Users point to two main reasons for waiting patiently for the Spectrum machines. "We have not considered leaving HP at all," says Richard T. Schwartz, director of MIS at communications products company General Datacomm Industries, Inc. in Middlebury, Conn. "It is an integrated part of our infrastructure. For us to move to a different vendor would be prohibitively expensive at this point."

Another reason for staying with HP is that its hardware is "bullet-

proof," according to John Proffitt, data processing manager at Hitco, an aerospace manufacturer in Gardena, Calif. "I have worked around for a few years, and I can't believe how reliable and dependable the HP hardware is. You can't break that machine."

Forest Evans, information systems manager at Evenflo Juvenile Furniture Co. in Piqua, Ohio, agrees. "HP is cost-effective, reliable, easy to run, easy to put new applications on. That is why people are loyal."

At Kirke-Van Orsdel, Inc. in Des Moines, Iowa, the simple need for more horsepower forced the insurance brokerage firm to place its early order for a Spectrum Series 930.

"We have a Spectrum 930 on order for the first quarter of 1987, and we intend to take delivery," systems development specialist Thomas Evans told *Computerworld*. "We were between a rock and a hard place. Our machine usage was up to about 95% during the day, and that made our response time very low."

In May, Kirke-Van Orsdel installed two Series 70 upgrades, which process data for various insurance carriers. According to Evans, the company's increased processing needs left little choice but to buy a Spectrum. "It was either that or order another 3000," he says.

Other users interviewed by *Computerworld* say it may be a few years before they order HP's RISC-based machines.

A Series 930 could make its way to H. P. Metzler & Sons by 1988, according to MIS director Bill Hardy. The Del Rey, Calif., agricultural organization has a Series 68 and plans to upgrade to the Series 70 in about six months.

Hardy is the former manager of computer services at HP and worked with one of the company's in-house Series 930s. "The 930 is every bit as good as the competition's right now," Hardy says. "It is miles ahead of Data General Corp., and although Digital Equipment Corp. has features like speed of processing which are better than HP's, the HP machine is easier to use and easier to get applications up on," he notes.

### Wait-and-see attitude

General Datacomm's Schwartz is taking a wait-and-see attitude on his company's Spectrum purchase.

He currently has three networked Series 68 machines, a Series 42 in Toronto and a Series 39 in London. Within 12 months, the company expects to buy the Series 70 upgrade.

Schwartz said he is likely to bypass the Series 930 and purchase the Series 950 — said to have three times the system throughput of the Series 68 — within three years. He plans to hang on to the company's Series 68s.

"We have definitely looked into the Spectrum machines. I'm reasonably comfortable with the hardware but not with the software," comments Schwartz, who says he thinks converting applications to a new operating system data base management system could be cumbersome. "I don't want to be one of the first," Schwartz says. "I'll let it work into the environment first."

## In this issue

### NEWS

Control Data adds cheaper, more powerful models to Cyber/180 mainframe, supermini lines/ 4

Applying packet switching to voice transmissions, Stratacom introduces T1 network management system/ 4

Mitchell Kapor resigns as Lotus chairman/ 6

PC Expo a success, despite few major product announcements/ 6

IBM cuts dealer prices on slow-moving micros, pressures dealers to drop clones/ 8

MIS execs seek mainframe-to-micro links, LANs, communications software at PC Expo/ 8

GEISCO scraps plans to enter automated clearinghouse business/ 9

Elksi to announce new CPU and expanded memory for System 6400 multiprocessor/ 10

Xidex Corp. to launch tape cartridges for IBM 3480-type subsystem use/ 12

Cambridge Plan International, Inc. accuses Datagraphix of pricing practices that stifle aftermarket competition for its own used products/ 13

Micro managers must look beyond technology and study their companies' particular businesses/ 14

### SOFTWARE & SERVICES

Computervision to offer users conversion tools and programming aids/ 19

Language Technology unveils added options in Release 4.1 of Recorder/ 19

### MICROCOMPUTERS

Microsoft announces mouse standard interface and accelerator board/ 27

Autodesk reconsiders its policy of not acknowledging users groups with dealer affiliations/ 27

Alloy storage subsystem lets IBM PC Convertible and desktop PC exchange data/ 27

### COMMUNICATIONS

Chipcom, Bridge unveil broadband Ethernet/ 33

Two communications software vendors begin supporting Sun Microsystems' Network File System/ 33

Vitalink introduces Translan III supporting T1 and parallel links/ 33

### SYSTEMS & PERIPHERALS

GE launches turnkey data base system for the office using Microvax II minis/ 41

Priam offers Winchester disk drives for use with IBM RT PCs/ 41

Lumber and paper producer MacMillan Bloedel decides to stay with an older HP 3000 mini and get the most out of it/ 41

### MANAGEMENT

Joel Friedman discusses issues raised by use of information for competitive advantage/ 77

How information managers can help protect companies from damaging lawsuits/ 77

Approaches vary on serving and controlling end users/ 77

### COMPUTER INDUSTRY

Software Research lays off staff, brings in new president/ 103

Wang to reduce work force by 1,600 in trying to save almost \$50 million/ 134

Cybernex pays IBM several million dollars to settle trade secret dispute/ 134

AST trims work force, readies desktop publishing products to make up slipping revenue/ 134

### PRODUCT SPOTLIGHT

As expert systems replace human experts, DP managers must get involved in selecting software and in building systems. Expert system development shells can provide firms with a strategic, competitive edge. By Mickey Williamson/ 51

### IN DEPTH

Time for the annual review: DP jobs change as fast as technology does, making evaluations a jumble of irrelevant job descriptions and changing performance expectations. A clear-cut yardstick transforms this annual chore into a productive meeting. By John Clarke/ 61

### IN DEPTH

Automating Sin City: Profiles of five DP managers in Las Vegas reveal efficient 24-hour operations amid gambling and glitter. By Colin McKinlay/ 67

### OPINION & ANALYSIS

Wohl on sorting out IBM's latest product blitz/ 17

Robins on the technical review process/ 19

Zachmann on Televideo's Telecat/ 27

Ulrich on preparing for communications disasters/ 33

Raimondi on IBM and Du Pont's reactions to claims that chromium-dioxide-based data tapes may be toxic and short lived/ 41

Vincent on why MIS should be a profit center/ 77

Warner on the European computer market's growth/ 134

### DEPARTMENTS



World Digest/ 15  
Editorial/ 16  
Turnaround Time/ 78  
Calendar/ 82  
New Products/ 91

ILLUSTRATIONS ON PAGES ONE AND 17  
BY ALAN WITSCHONKE



# SMART COOKIE

Like you,  
**SyncSort DOS**  
is cut from  
a special mold.

Call (201) 930-9700.

It's healthy  
for your  
system.

One thing about smart cookies, they can spot each other a mile away.

While they don't flaunt their derring-do, they quietly know they're the best at what they do. Because substance shows through. Every time.

Especially when the going gets tough. And rough. As it often does in a DOS environment.

For example, a smart cookie doesn't crumble under the pressure of too many programs and too few programmers.

A smart cookie doesn't waste dough — but picks and chooses the right ingredient to keep production on the rise.

And sometimes, even, a smart cookie has to be a mighty tough cookie. That means being on the job constantly. Keeping things running and humming. Without draining vital resources.

All of which brings us to our smart cookie: SyncSort DOS. A cut above the rest if you ever saw one. Check these delicious advantages.

## BETTER PERFORMANCE

Pop one into your system and you'll see a mouthwatering difference. Immediately. SyncSort DOS will give you performance improvements like those shown in the chart on the left.

And performance features such as:

- **Automatic Secondary Allocation** — With this feature your sorts will never run out of disk space, i.e., no "sort capacity exceeded" messages.

## BETTER FEATURES TO IMPROVE PROGRAMMER PRODUCTIVITY

As you begin to digest SyncSort DOS, you'll find it more and more to your liking. With ingredients that cut down to size the amount of programming time going into applications.

- **SortWriter** — A powerful tool that can produce extensive reports as a by-product of your normal sorting — without user exits and the associated programmer investment. Headers, trailers, total and sub-total capabilities provide flexible formatting.

- **Record Formatting** — Powerful features like INCLUDE/OMIT, INREC/OUTREC, SUM and others — with capabilities like data conversion, editing, insertion of literals.

- **Multiple Output** — From a single sorted file, you can create multiple files and reports. Each can include the same or different data as determined by INCLUDE, OMIT, OUTFIL or OUTREC parameters.

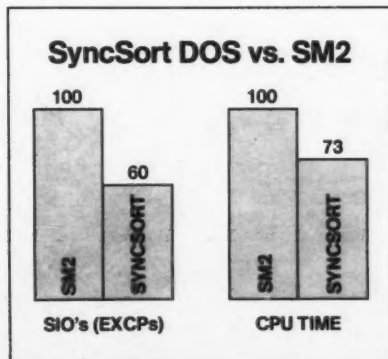
## BETTER CUSTOMER SERVICE

Still another sweet advantage of SyncSort DOS: help is always there when you need it. 85% of all requests for service are resolved within 24 hours. We always rise to the occasion.

The moral to this story: smart cookies are quick to reject half-baked solutions in favor of SyncSort DOS. Call us for a demonstration. Once you get a taste you will be hungry for more.

**SyncSort DOS**

**One smart cookie deserves another.**



**syncsort**  
INC.

Syncsort Incorporated 50 Tice Boulevard, CN18, Woodcliff Lake, N.J. 07675



## NEWS

# CDC enhances, cuts price of Cyber/180 line

**Says competition, lower costs prompted slashes**

By James Connolly

MINNEAPOLIS — Control Data Corp., citing reduced manufacturing costs and competition from IBM and Digital Equipment Corp., last week slashed prices by up to 30% on its Cyber/180 line and enhanced that family of superminicomputers and mainframes.

CDC introduced nine enhanced models of the 2-year-old Cyber/180 product line. The three low-end models feature lower prices and double the memory capacity of their predecessors. The four mid-range models offer the same memory as before but have lower prices and a new I/O subsystem. The new high-end Model 990E and 995E dual processors feature lower prices as well as quadru-

pled memory.

"We have been on a learning curve, and we have had a goal of continuing reductions in the manufacturing costs of this family of computers. So it is a balancing of a reduction of manufacturing costs and a reducing of pricing to stay competitive and still trying to maintain your margin," said Jim Murdakes, CDC vice-president of sales and marketing for computer systems and services.

Some of the sharpest price cuts and memory boosts were in the high-end models. Where a Model 990 previously had a maximum memory of 32M bytes, the 990E and 995E now offer up to 128M bytes of memory. A 990 used to cost \$3.35 million for an 8M-byte system, while a 16M-byte 990E now costs \$2.35 million. CDC also announced a high-speed I/O option for both models.

The new low-end models are the 810A, 830A and 830A Dual CPU su-

perminicomputers. The 810A costs \$121,000 with 8M bytes of memory, compared with \$125,000 for a 2M-byte 810. The 830A with 16M bytes costs \$175,000, \$5,000 less than a 2M-byte 830. The 830A Dual CPU with 16M bytes costs \$252,000, rather than the \$290,000 that the 830 Dual CPU cost with 2M bytes of memory. Memory for all three low-end systems was doubled from 32M bytes to 64M bytes.

Prices for the mid-range 840A, 850A, 860A and 870A units range 18% to 25% below their predecessors. A typical 840A with 16M bytes costs \$580,000, and a typical 870A with 16M bytes costs \$1.98 million.

While memory remains the same in the mid-range systems, the new models feature a field-installable I/O subsystem that was designed to double the ability to transfer data from main memory to peripherals. The subsystem costs \$290,000.

## COMPUTERWORLD

**Publisher**  
Donald E. Fagan

**Editor in Chief**  
Terry Catipolce

**Executive Editor**  
Sharon Frederick

**News Director**  
Peter Bartolo

**Senior Editors**

James Connolly, Systems  
Clinton Wilder, Industry  
Elizabeth Horvitz, Communications  
Charles Babcock, Software  
David Ludlum, Management  
Douglas Barney, Microcomputers

**Senior Writers**

Donna Ramond  
Rosemary Hamilton  
Eddy Goldberg  
Stanley Gibson  
David Bright

**New Products Editor**

Suzanne West

**Intern**

Susette Burton

**Features Director**

George Herra

**Senior Editors**

Janet Fidenio

Glenn Rifkin

Barbara Wierzbicki

**Associate Editors**

Amy Sommerfield Fice

Becky Balch

**Assistant Editor**

Deborah Fickling

**Senior Writer**

Michael L. Sullivan-Tranor

**Managing Editor**

Dorovan White

**Chief Copy Editor**

Charlotte Ziems Donaldson

**Assistant Chief Copy Editor**

Patricia Hall Erickson

**Copy Editors**

Julie Cook

Perry Janzen

Susan Miller

Kelly Shea

Steven M. L. Bolder

David W. Bromley

Mary Grover

**Design Editor**

Marjorie Magowan

**Graphics Editor**

Michelle J. Hayes

**Graphic Designer**

P. Charles Ladouceur

**Graphics Assistant**

Jeff Babineau

**Assistant to the Editor in Chief**

Parth Dornik

**Editorial Assistants**

Patricia Faherty

Christie Sears

Linda Gorgone

Laura Fredrickson

**Rights and Permissions Manager**

Nancy Shannon

**News Bureau**

**Mid-Atlantic**

201/967-1350

Alan Alper, Correspondent

**Washington, D.C.**

202/547-6718

Mich Berts, Correspondent

**Southwest**

404/394-0758

James A. Martin, Correspondent

**West Coast**

415/328-8064

Jeffrey Beeler, Chief

Maura McEnaney, Correspondent

Peggy Watt, Correspondent

**Computerworld International News Service**

Susan Blakeney, Director

Edward Wiener, Editor

**Main Editorial Office**

Box 9171, 375 Cochituate Road,

Framingham, MA 01701-9171 617/879-0700

Computerworld is a member of the CW Communications Inc. group, the world's largest publisher of computer-related information. The group publishes over 50 computer publications in more than 20 major countries. Nine million people read one or more of the group's publications each month. Members of the CWCI group contribute to the Computerworld News Service, a daily on-line service offering the latest on domestic and international computer news. Members of the group include: ARGENTINA's Computerworld/Argentina; ASIA's Asian Computerworld; AUSTRALIA's Computerworld/Australia; AUSTRIA's PC World and Macworld; BRAZIL's DataNews and PC Mundo; CHINA's China Computerworld and China Computerworld Monthly; DENMARK's Computerworld/Denmark; PC World and Run (Commodore); FINLAND's Mikro; FRANCE's Le Monde Informatique, Golden (Apple), OPC (IBM), Theorem and Distributeur; GERMANY's Computerwoche, Informatik, PC Welt, Computer Business, and Run; ITALY's Computerworld Italia and PC Magazine; JAPAN's Computerworld Japan, MEXICO's Computerworld/Mexico; THE NETHERLANDS's Computerworld Netherlands and PC World; NORWAY's Computerworld Norge and PC Mikrodatt; SPAIN's Computerworld Espana, PC World and Commodore World; SWEDEN's ComputerSweden, Mikrodatorn, and Sveriska PC World; SWITZERLAND's Computerworld Schweiz; THE UNITED KINGDOM's Computer News, PC Business World, and Computer Business; VENEZUELA's Computerworld Venezuela; the U.S. Amiga World, Computerworld, iCider, Informatik, MacWorld, Micro Marketworld, PC World, Run, 72 Magazine, 80 Micro, Focus Publications and Network World.

# Net manager offers quality voice packeting

**Stratacom jumps into field while AT&T stalls**

By Stanley Gibson

NEW YORK — Applying packet switching to voice transmissions, Stratacom, Inc. last week introduced a T1 network management system. Its Integrated Network Exchange (IPX) is apparently the first commercial product to offer high-quality voice packetization technology.

Richard Moley, Stratacom president, said the advantages of the system are a four-to-one improvement in bandwidth efficiency, greater reliability and more flexibility in configuring a network. The Cupertino, Calif.-based company plans to sell the product to companies that manage their own T1 networks.

Packet switching, introduced in the 1970s for data transmission, has not been successfully applied to voice transmission before, owing to the different natures of voice and data. According to Moley, traditional packet switching systems typically transmit approximately 1,000 packets per sec-

ond over a T1 line, a rate that is acceptable for data but not for voice. The Stratacom system transmits 160,000 packets per second over a T1 link, resulting in high-quality speech, he said.

## Another barrier

The other barrier to packetized voice is the fact that, unlike data, voice packets that arrive out of sequence cannot be retransmitted, since voice exchanges occur in real time. Stratacom circumvented this problem with an algorithm that drops all packets that arrive out of sequence, rather than trying to retransmit them. The company claims this procedure results in no perceivable degradation of transmission quality.

Voice packetizing is "a technological breakthrough because instead of having to allocate separate channels for voice and data, you can combine the two in the same channel, permitting far more efficient utilization of bandwidth," said Joaquin Gonzalez, senior analyst at the Gartner Group of Stamford, Conn.

Stratacom's product is "extremely

sophisticated from a technical point of view" but may never get off the ground because AT&T Bell Laboratories is working on a similar technology that is likely to be the industry standard, Gonzalez added. "Companies are likely to hold off buying from a small company and instead wait for the standard that the gorillas of the industry will use."

Following a technological path parallel to Stratacom's, AT&T Bell Laboratories said it recently completed a field test of its own voice packetization system in the San Francisco area.

Bell Labs said its voice packets travel at one million pulse code modulations per second and achieve a fivefold improvement in bandwidth efficiency. However, a Bell Labs spokesman said AT&T has "no immediate plans to implement it."

Both systems achieve voice compression by interleaving different voice conversations over the same channel, thus making use of the silences inherent in normal speech.

Stratacom said it uses adaptive differential pulse code modulation to gain another two-to-one improvement in performance, resulting in a four-to-one improvement over conventional speech transmission. In this way, it is possible to send 96 voice circuits over a normally 24-channel T1 carrier.

Stratacom said its IPX has been tested by and is compatible with AT&T and Rolm Corp. equipment. The IPX offers a D4 format that supports channel banks, multiplexers compatible with AT&T's Digital Access Cross Connect Switch and value-added T1 transmission carriers. IPX was also designed for Integrated Services Digital Networks integration, Stratacom said.

Stratacom is now setting up a direct sales force and is "looking at OEM and strategic alliances," Moley said.

Prices for an IPX system range from about \$50,000 to more than \$1 million, depending on the number of T1 lines and nodes in the network.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (5 issues), February (5 issues), March (6 issues), April (5 issues), May (5 issues), July (5 issues), August (5 issues), September (6 issues), October (5 issues), November (5 issues), and a single combined issue for the last week in December and the first week in January by CW Communications, Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

Copyright 1986 by CW Communications, Inc. All rights reserved.

Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed: write to Circulation Dept. for subscription information.

**PHOTOCOPY RIGHTS:** permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Communications, Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$5.00 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, Mass. 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol.

Special requests for reprints and permissions only should be addressed to Nancy M. Shannon, CW Communications, Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Subscriptions call toll free (800) 544-3712 or (215) 768-0388 in Pennsylvania.

Subscriber rates: \$2.00 a copy; U.S. — \$44 a year; Canada, Central & So. America — \$110 a year; Europe — \$165 a year, all other countries — \$245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Department, P.O. Box 1016, Southeastern, PA 19398-9984.



# For tough applications, we don't force you into a mold.

## We help you break it.

Because every business is unique, none exactly fits all the application "molds" offered by vendors.

Some may fit comfortably, but there are those you simply can't buy. Applications you need to develop to fit your specific operation. Applications you need to give you a competitive edge.

Computer Corporation of America's MODEL 204 DBMS has a true fourth generation environment that lets programmers tackle complex applications in the toughest situations. Fast.

In fact, CCA's easy-to-use fourth generation language is so complete that we use it to write the programs for all of our own products.

Products like WORKSHOP, MODEL 204's suite of application development tools. Which automates routine programming tasks so programmers can spend their time creatively on the more complex, custom features of a particular application.

And, since MODEL 204 reads COBOL descriptions directly, existing application investments can be preserved. Data can be extracted from several production systems and loaded into MODEL 204 with no conversion. And enhanced any time the need arises. Quickly.

So, before you limit your way of doing business to "off the shelf" solutions for your IBM mainframe environment, consider the DBMS that lets you break through the mold to fit your business. CCA's MODEL 204 and WORKSHOP.

Get the facts. Write John Donnelly, V.P. Marketing, Computer Corporation of America, Four Cambridge Center, Cambridge, MA 02142. Or, call 1-800-258-4100, extension 602.

### Computer Corporation of America



A Crowntek Company

Software innovators creating better ways to manage business.



## NEWS

# Crowds jam PC Expo show

## Show succeeds despite lines, confusing layout

NEW YORK — Despite few major product announcements and some minor glitches such as long, slow registration lines, the PC Expo show, held last week, was a success, according to exhibitors and attendees.

Unlike other trade shows, such as Comdex and the National Computer Conference, PC Expo attempts to limit registration to corporate buyers.

Ralph Ianuzzi Sr., the show director, said the show attracted approximately 30,000 attendees.

Product announcements, although large in number, were not the show's strong suit, according to attendees.

### Personal Computer AT compatibles

Among the more than 25 firms announcing products at the show, Wyse Technology, Inc. introduced a line of IBM Personal Computer AT compatibles priced from \$2,499.

Core International, Inc. announced a 1000M-byte internal hard disk drive for the IBM PC AT, along with the Atomizer, an IBM AT-compatible that Core will sell with a choice of two 260M-byte hard disk drives or its

1000M-byte unit.

Lotus Development Corp. made the biggest splash when it unveiled The Application Connection (see story, page 1), a line of products that allow PCs to extract data from a variety of mainframe applications.

Other announcements focused mainly on communications and included new modems, enhanced networks and terminal emulation.

While most attendees were pleased with the show, some were critical of the show's lack of organization. "It is terrible to go see an exposition where people are trying to sell you things and have to wait in line for an

hour. You don't wait that long at Disneyland," said Ben Lichtenstein, president of Alexander Ross Associates Inc., a New York-based search firm. Another key criticism was the confusing show floor layout, which made booth location difficult for some attendees.

Other showgoers were disappointed by the lack of new products. "There is a lot of a faddishness. I see a lot of people trying to sell the same types of things. But it is upbeat," said Charles Rosenbaum, training specialist for the New York City Department of Social Services.

— Douglas Barney

Other PC Expo coverage. Page 8

# Kapor resigns as Lotus chair, turns legacy over to Manzi

By David Bright

CAMBRIDGE, Mass. — Moving on to an "intentionally unstructured period," Lotus Development Corp. founder Mitchell Kapor resigned as chairman last week.

Kapor will remain on the board of directors and serve as a consultant to the company while formulating personal plans that do not involve Lotus. Jim Manzi was named chairman of the \$225.5 million software giant and will remain president and chief executive officer as well.

Lotus' primary product — the Lotus 1-2-3 integrated spreadsheet package — was a major factor in making the personal computer an important business tool and has spawned hundreds of imitations. Founded in 1982, Lotus now employs some 1,200 people and boasts approximately two million customers. Lotus has lately been on an acquisition binge, acquiring all or parts of five firms in the last 18 months.

Despite all that activity, Kapor told *Computerworld* last week that he needs some breathing room in order to do his best at this point in time. He is unsure what his next venture might be.

"It is my actual intent to go into an intentionally unstructured period, because I have done well in the past when I did that." Since that was the type of period he was in when he cre-

ated Lotus, "it might lead to something like that," he added. However, his next challenge, as yet undetermined, could be outside the computer industry. "Before Lotus, I was a mental health worker, I was a disc jockey, I was a meditation teacher," he said.

"It's not impossible that the next thing could be as different from Lotus as Lotus was to those things. What excites me at this point is the opportunity to go on a great adventure that's personally meaningful. To do that, you have to be willing to explore things."



Mitchell Kapor

Kapor said he will complete the software project he has been working on with research and development vice-president Ed Belove and other staff members. That project involves a product that is neither a spreadsheet nor a word processor but an aid to the organization of text and ideas, he said.

Although Lotus has entered a critical stage in its history, Kapor maintained the company will be in good shape without his close direction. "The people running the company — Jim, the management team and the people here — are the ones with the vision and the fire and the capability to make Lotus be successful from the stage it's in now to the next stage."

While his name has been synonymous with Lotus' for nearly four years, Kapor said the post-1-2-3 legacy would belong to Manzi.

# Lotus aims at micro-MIS mart

From page 1

ber, Inc.'s technology group.

Bruce Watts, an analyst with Morgan Keegan, an investment firm based in Memphis, Tenn., said he believes Lotus' pricing is fairly aggressive. "I don't think, however, that it is priced so aggressively that they won't make any money on it," Watts said.

TAC consists of three elements: PC software, mainframe software that works with specific fourth-generation languages and data bases and a central connection module for either VM or MVS.

Most of Lotus' enhancements to Ilink focus on the PC software, which was originally written in Basic and later moved over to C. Lotus added pop-down menus and roll bars similar to those in 1-2-3 and improved the speed of the PC software, said Mussie Shore, TAC product manager for Lotus.

In addition, Lotus developed optional programs for 1-2-3, Symphony and Ashton-Tate's Dbase III that allow for the use of TAC without exiting PC applications and use the applications' own interface when extracting data. These options will sell for less than \$100.

Lotus also streamlined the mainframe interface and increased the performance by 30% for the MVS version and 20% for the VM version. "The old mainframe interface had a whole bunch of questions it would ask the user. We were able to remove those questions and code the intelligence to figure it out itself," Shore said.

TAC currently includes versions to extract data from languages such as Martin Marietta Data Systems' Ramis; Information Builders, Inc.'s Focus; SAS Institute, Inc.'s SAS; IBM's SQL/DS, IC/1 and ADRS2; D&B Computing Services Co.'s Nomad2; and Business Information Systems, Inc.'s ADL/DI, Lotus claimed. This data can be translated into PC formats such as WKS, WRK, WK1, WR1, DIF, CSV,

PRN and Sylk.

Lotus developed the Nomad2 and SQL/DS connections itself and said a version for IBM's DB2 will be in beta test by the end of the year. TAC works with the IBM 370; IBM 4300 processor series; 3030, 3080 and 3090 series; and compatibles.

The product announcements at last week's PC Expo show drew a mixed response from micro managers and corporate buyers. Some wondered whether Lotus has the sophistication to sell into the new market.

Others were disappointed that the Lotus offerings do not work with more machines. "The problem is they only acknowledged that firm with three initials that is also Blue. When I asked 'Can you do the same thing in the Digital Equipment Corp. environment?', they say no," commented Raye Schwartz, DP manager for Townley & Updike, a New York-based law firm.

Lotus officials, however, say they believe the ability to work with IBM mainframes is currently more important than working in the DEC environment.

"There is a significant critical mass on the IBM mainframe side," said Alexander D. Crosett III, information center group manager for Lotus, citing IBM's large installed base of mainframes.

Commenting on moving the product line over to the VAX, Crosett said, "It is a future-oriented thing." The main problem in moving to the DEC environment involves issues of distributed data bases on minicomputers, Crosett said. "There is nothing about the architecture that doesn't lend itself to more complex network topologies," noted Peter Meekin, marketing director for Lotus.

Users of the earlier versions of Ilink, however, were pleased with the announcement. "Users will see results faster. It is going to be much easier to use," said Denise Smith, information center analyst for Wright Line, Inc., a Worcester, Mass.-based computer supplies manufacturer. "It will be much easier for me to use for ad hoc requests for users and to train someone who is going to use it on a regular basis."

# Post-merger Burroughs eyes telecom

By Takehisa Kondoh  
Computerworld News Service

TOKYO — In an effort to allay the fears of Japanese customers, Burroughs Corp. Chairman W. Michael Blumenthal pledged here Friday to keep both Burroughs' and Sperry Corp.'s existing and future hardware and software lines separate and distinct. The two companies merged six weeks ago.

The company that will arise from the merger, Blumenthal maintained, will orient itself during the next 10 years toward systems integration and telecommunications. The company will fine-tune its strategies toward regional markets, he said.

The merged company, he elaborated, will also "continue to support, develop and enhance the separate individual architectures and software developments of the two companies. There's no change in that at all," Blumenthal said.

Blumenthal met with the press during a week-long trip to Japan.

During that trip, he said he conferred with representatives of "many hundreds of Sperry and Burroughs users."

Sperry Chairman Gerald G. Probst, who accompanied Blumenthal, said Sperry is "completely in accord [with Burroughs] in terms of the ways in which we plan to operate."

Sperry and Burroughs products are distributed in Japan by Nippon Univac Kaisha K.K. and Burroughs Co., respectively.

The merger, he predicted, will make the new company united and stronger, both financially and technically. Blumenthal called the merger a "historic event," representing a "very important change in the structure of the world computer industry and [creating] the second major force of great size and importance to the industry."

Both companies, he elaborated, had been "doing well separately, [but realized] we could do even better together."



## HELP WANTED

# ASSISTANT TO VM OPERATOR

Experienced operator assistant wanted in busy VM Data Center. Duties include instant collecting, analyzing, and logging of all incoming messages to operator. Must have ability to differentiate between critical and routine messages at a glance, monitor more than one machine at a time, work at more than one console at a time (regardless of distance), answer an unlimited number of messages at one time, and keep a complete written log of all operator activity. Must be able to support 3270 class terminals, work 24 hours a day, 365 days a year. No vacation or sick leave. Salary \$6,000 decreasing to zero in subsequent years.

# THE PERFECT EMPLOYEE?

**ANNOUNCING THE MULTI-TALENTED AND DEDICATED  
"GOFER" FOR YOUR VM DATA CENTER...VMOPERATOR.**

Suddenly, good help is no longer hard to find! With the new VMOPERATOR, you can instantly solve many of those little administrative and manual jobs in your Data Center...and allow your operators to concentrate on the more important parts of their jobs.

### THE DEDICATED "GOFER"

VMOPERATOR does everything but make the coffee. It logs in all messages, differentiates between important ones (like spool space is full) and unimportant ones (like login/logout information) and keeps your operator informed.

Instead of waiting for you to clear the screen and then losing the messages forever, VMOPERATOR "rolls" messages off the screen, saving them for your review. Critical messages are highlighted and kept on the screen until you take specific action to correct the problem.

Nothing is missed. As a multi-threaded system, VMOPERATOR can perform concurrent processes in the most hectic of situations.

In larger VM installations, VMOPERATOR can distribute messages to multiple consoles

(such as tape mount messages, etc.)...and can monitor other virtual machines (by allowing the operator to observe the activity on a disconnected machine).

Even in cases where there is no operator, VMOPERATOR can be the link between a designated userid and the operator console.

Best of all...VMOPERATOR installs in less than an hour and can be easily tailored to meet almost any needs.

### INTRODUCTORY OFFER THROUGH AUGUST 31

VMOPERATOR is regularly priced at \$8,000. But until August 31, you can get VMOPERATOR for the special introductory price of \$6,000. And if you are a VMCENTER customer, be sure to ask about the special discount for you.

To order VMOPERATOR under our special introductory price...and with a free 30-day trial period, phone:

**800-562-7100**

(703-821-6886) in  
Virginia and outside  
the continental US).



**VMOPERATOR FROM VM SOFTWARE, INC...THE VM EXPERTS**

1-CWX-860714



## NEWS

## Big Blue cuts to dealers seen double-edged

By David Bright

BOCA RATON, Fla. — IBM early this month quietly reduced dealer prices on selected models of its Personal Computer line. The action was seen by observers as both a retaliation against the growing legions of low-priced clones and as a clearance sale to make room for a new generation of Personal Computers expected later this year.

The action became public last week and resulted in price reductions to dealers of as much as 18% on selected models of the PC line. Industry insiders fear that in addition to competing through lower prices, IBM may soon start directly pressuring retailers to stop selling copycat machines, which the firm has reportedly already attempted to do in the UK.

While not revealing the exact amount of the reductions, a spokesman at the IBM Entry Systems Division confirmed that wholesale prices on two IBM PC models and one IBM PC AT model had taken effect for a limited period of time. "We consider this to be a routine type of promotion, the type of promotion that we offer periodically throughout the year," the spokesman said. However, he said such promotions normally occur during the fourth quarter.

### Price cuts on slow-selling models

"I'm surprised it took them so long [to cut prices]," said Aaron Goldberg, vice-president of microcomputer services at International Data Corp., a Framingham, Mass.-based market research firm. Goldberg pointed out that the price reductions are only on slow-selling machines — the older IBM PC and the 6-MHz version of the PC AT, which has not been selling well since IBM introduced an upgraded 8-MHz version three months ago [CW, April 7]. Goldberg predicted that IBM will discontinue the basic PC by the end of the year.

Any significant dealer savings will be lost as the highly competitive climate forces dealers to reduce their retail prices, predicted Norm Dewitt, an analyst with Dataquest, Inc. of San Jose, Calif.

Dewitt predicted that as soon as late third-quarter '86, IBM will release a PC replacement family based on the PC Convertible architecture.

According to Patrice Johnson, president of the 200-member Association of Computer Retailers in Michigan, dealers will "absolutely" be dropping some clones. If they do not, she said, IBM may put pressure on them by withholding support and advance sales information.

The war has already been waged extensively in England, where the clones have caused IBM's sales to slip, sources said. One dealer told *PC Business World* that outlets selling Compaq Computer Corp. and Olivetti Corp. IBM compatibles were feeling the strain. "Our IBM salesman asked us to remove our Compaq promotional material and replace it with advertisements for the IBM PC," he explained. IBM spokesmen in the UK were unavailable for comment.

## Connectivity, clones top concerns at PC Expo

### Attendees are cool on IBM's Token-Ring

By Alan Alper

NEW YORK — Communications products that would serve their firms into the next decade were on the wish lists of many MIS managers attending the PC Expo trade show held in New York last week.

A number of MIS managers also said that for the first time, they were seriously looking at lower priced IBM Personal Computer clones. Others, however, said they worry about the software compatibility of the clones.

"Sharing information and connectivity are the biggest issues," noted Elizabeth Clark, technical officer at Manufacturers Hanover Trust Co. in New York.

Because of its worldwide presence, the bank is always looking for more effective means of communicating within and from outside the organization. "We're always looking at 3278 and 3279 emulation for communicating locally," Clark said. "We'd also like to develop a means for peo-

ple traveling outside the organization to transmit data back to the office. We're looking at portables with tools like Borland International, Inc.'s Sidekick and things like that."

Ira Ehrenfeld, senior technical advisor at Buck Consultants, a Harmon Meadow, N.J., benefits consulting firm, said mainframe-to-micro connections would be the focal point of his endeavors for some time to come.

"Everyone has been talking about the IBM Token-Ring for the last two years. They'll probably be talking about it for the next few years as well, but the key issue at our firm is the need for PCs to be able to access data from the mainframe," he said.

Buck currently has one IBM PC XT 370 that can access files from a mainframe operating under IBM's VM. That is grossly inadequate for a firm with 250 stand-alone PCs located in 20 offices nationwide, and in which several departments need to get at the same data, Ehrenfeld said.

Russell Harding and Robert Harkins of The BOC Group in New Jersey, a manufacturer of gases and welding supplies, were searching for a local-area network. "We looked at

the IBM Token-Ring, but we don't think it's there yet," said Harkins, who is the firm's PC coordinator.

Harkins is troubled by the fact that one PC AT on the network has to be a dedicated file server. Other vendors' schemes also permit the PC AT handling file serving to function as a workstation, he said.

Surveying the various PC clones on the exhibit floor, many of which were priced 15% to 20% below comparable IBM products, a number of MIS managers seemed tempted to try the non-Blue micros.

"We have no apprehension about going with non-IBM micros," noted Thomas Finnessey, of Urbach Kahn & Werlin, an accounting firm in Albany, N.Y., that currently uses IBM micros exclusively. "As long as we can get service for the products, it doesn't matter who builds them."

Some firms are afraid to venture outside of Big Blue's calm, compatible waters, however. "If we had to evaluate all the other clones to make sure they are compatible, our department would have little time for anything else," noted Jerry Garson, an accountant at Mobil Corp.

## Owners resist filing net info

From page 1

competitors with access to critical strategic information.

While the current proposal would only affect organizations in Utah, the Telecommunications Association (TCA), a national user organization of telecommunications managers, claims the rule could establish a precedent for other areas of the country.

"Every time people start talking about this rule, you see the hair on the backs of their necks rise," says Stephen Merrill, telecommunications administrator at the University of Utah. Private network owners "do not like the government prying into their affairs," he adds.

The Utah Telecommunications Managers Association, a state users group, is "united around this particular issue: We're against it," Merrill says. "I'm taking the stance that the university is exempt from the reporting requirement because it is a public institution and, therefore, has no private network, even though we use private lines."

Gary Robinson, a technical engineer at a Salt Lake City broadcasting company, Bonneville International Corp., says his company opposes the rule and will claim exemption on the grounds that commercial broadcasting ventures fall under the jurisdiction of the Federal Communications Commission.

"We are claiming exemption not only for our broadcast facilities but also for private network operations such as our satellite and microwave links," Robinson says. "Even though some of those links could be considered bypass, they all relate to our primary business, which is FCC licensed." Both Merrill and Robinson concede the commission could disagree with their interpretations.

Utah Public Service Commission

staff director Doug Kirk says the intent behind the rule is for the commission to monitor, not control, private networks that bypass local operating company facilities. "Just over a year ago, the state legislature passed a law allowing us to do this."

Kirk adds that the rule "is likely to be altered in response to the comments that have been submitted."

In its current form, the rule would require organizations to send a notice to the commission on existing private network installations and report on additions and changes within 30 days after implementation.

Each notice would contain 20 items of information, including size of network facilities, types of users, types of lines, operations costs, reasons for installation and identification of "facilities and/or services previously provided by a local carrier that were eliminated or reduced as a result of the system's construction or expansion," the ruling states.

### TCA takes issue with ruling

In the filing, the Utah Public Service Commission says that "compliance costs for affected corporations and persons will be minimal." In comments it filed with the commission, the national TCA disagreed, taking issue with the reporting requirement in three areas.

First, the rule "will impede or discourage the development of private telecommunications systems" by imposing "a heavy compliance burden in terms of cost and resources needed to prepare and file the reports," the TCA says. "It could take considerable effort to answer all 20 questions; not all companies have kept complete records of their installations," says Michael Woody, the TCA's vice-president of regulatory affairs.

The rules also would require that network owners make a report every time they add a new customer or expand their networks.

The user organization's second objection is that the public reporting of proprietary information would have

an anticompetitive effect on the owners and operators of private lines. "Once the information is on file with the commission, anyone can look at it," Woody says. "A telecommunications manager of a competing company can find out what my network capacity is, where it goes and whom it serves. That's serious."

The TCA also believes the requirement is "inconsistent with federal statutes and policies and is preempted by order of the Federal Communications Commission."

Michael Senkowski, a partner at Riley & Rein, the law firm that acts as the TCA's general counsel, helped draft and submit the comments. The Utah Public Service Commission claims that the purpose of the proposal is to help it enforce FCC regulation Part 94, Senkowski says. Part 94 allows, but also restricts, the resale of excess capacity on private fiber-optic and microwave networks.

"The FCC has stated that Part 94 preempts state involvement in this area," Senkowski says. "We plan to get the FCC involved if the Utah Commission looks serious about passing the rule," he says.

The TCA suspects divested Bell operating company Mountain Bell is a prime mover behind the proposal, Woody says. "I don't know that Mountain Bell is behind this, but it's very suspicious that the rule requires private network owners to identify 'any facilities and/or services previously provided by a local exchange carrier.' This tells them how much revenue they are losing as a result of private network installations."

Mountain Bell has taken a neutral position in regard to the proposed rule, according to spokeswoman Carol Dunlap. "We are not behind the rule. We are taking no action for or against its adoption," she says.

Mountain Bell, she adds, is "pro-competition and pro-deregulation. Private network technology is already here, and we don't see how it can be effectively policed, even if the rule goes into effect."



## NEWS

# GEISCO scraps plans for automated clearinghouse service

## Federal Reserve retains near-monopoly in mart

By Mitch Betts

General Electric Information Services Co. (GEISCO) last week announced that it is scrapping its plans to create a nationwide automated clearinghouse service for banks, partly because of what it called unfair competition from the Federal Reserve System.

GEISCO, based in Rockville, Md., claimed it had spent more than \$10 million to position itself to enter the automated clearinghouse business, a service that clears electronic payments for banks. The attempt was part of a new GEISCO strategy to use its global teleprocessing network to handle electronic payments and document exchanges in vertical markets [CW, May 5].

The GEISCO decision was a disappointment for supporters of private-sector competition to the Federal Reserve, which has a near-monopoly on bank automated clearinghouse operations. William R. Moroney, president of the National Automated Clearing House Association (NACHA), said banks support competition in hopes of getting lower fees, better service and "innovative stimulation in the marketplace."

Other companies that have expressed interest in starting an automated clearinghouse business are AT&T Communications, Automatic

Data Processing, Inc., J. C. Penney System Services, Mastercard International and Visa USA, Moroney said. GEISCO operates a regional automated clearinghouse in California, a move that was considered a stepping stone to a national operation.

David A. Shepherd, manager of GEISCO's payment services operation, said the decision against launching a nationwide automated clearinghouse was based on the slower-than-expected growth in the volume of the business and policies of the Federal Reserve Board.

"The overriding issue, simply stated, is that the Fed, in its dual role as regulator and service provider, has established and maintains a frame-

work for providing automated clearinghouse services which enables its 28 automated clearinghouse processing centers to enjoy preferential treatment over any private-sector providers," Shepherd said.

Specifically, he complained that the Fed's access deadlines, fees and settlement conditions are not equitable or compatible with a private-sector clearinghouse business.

A Federal Reserve Board official could not be reached for comment, but the Fed reportedly has denied that it has an unfair advantage over private automated clearinghouse operations. In March, the reserve board made several rule changes intended to create a more favorable climate for

private-sector competitors.

NACHA President Moroney said the Fed's rule changes in March were a step in the right direction but that more reforms were needed to encourage private-sector automated clearinghouse businesses.

GEISCO's Shepherd said that in the future, if the Fed makes policy changes favorable to private-sector automated clearinghouse processors, GEISCO may change its decision.

An automated clearinghouse in the banking industry processes certain types of electronic funds transfers, such as direct-deposit payroll and Social Security payments, utility payments, insurance premiums and other preauthorized payments.

## How to become the outstanding CICS programmer in your COBOL shop for \$50...or less!

To be an outstanding CICS programmer, you have to write programs that (1) are done in a fraction of the time it would take another CICS programmer to develop them... (2) are easy to maintain when user requirements change... (3) are so reliable they cost next to nothing in terms of "fixing" once they're in production... and (4) run more efficiently than 90% of the other CICS programs in your shop.

If you're ready to learn how to create programs like these, we've got the course for you. It's called *CICS for the COBOL Programmer*, and it comes in 2 parts. You can choose either or both, depending on your current level of CICS skill.



### What Part 1 does

**Part 1: An Introductory Course** covers the basic command-level elements you'll need in every CICS program you write. So you'll learn how to: create and use basic mapping support (BMS) mapsets...write pseudo-conversational programs...use CICS commands for terminal handling, VSAM file handling, and program control...design a CICS program so it's easier to code, test, debug, and maintain...debug CICS abends using either the Execution Diagnostics Facility (EDF) or a storage dump...and more!

### What Part 2 does

**Part 2: An Advanced Course** covers the CICS elements you'll use regularly, though you won't need them all in every program. You'll learn how to: use browse commands, temporary storage queues, and transient data queues...apply DL/I data base processing to CICS programming...use interval control commands to start a task...produce multiple output using BMS page building...and more!

### Why these books will make you an outstanding CICS programmer

When you read about CICS courses and what they cover, they may sound pretty much the same. So why do I say this course will offer you the expertise that others don't? There are 3 main reasons:

**1. Program design** None of the other CICS courses I've seen spends much time talking about program design. But these books show you how to break your CICS programs down into functional modules that are manageable when it comes to coding...and that make it easier to pinpoint errors during testing. What's more, if you use this design method, you can lift whole chunks of the design (and the

resulting code) from one program to use in the next.

That means you'll be able to design and code programs faster, because you won't start each program from scratch. And you'll be able to debug them faster, because half of the code will come from other programs that have already been tested and debugged.

**2. Examples** To make it easier for you to master the complexities of CICS, these books are chock-full of examples...from syntax summaries for CICS commands to schematic illustrations that show how various CICS elements work. But more important, these books give you complete design and code for 16 CICS programs (5 in Part 1 and 11 in Part 2).

Examples like these will help you in 2 ways. First, when you're reading the texts, they'll help you understand the CICS elements you're learning about. Second—and this relates to what I said about design—you'll be able to use the examples as models when you're writing your own programs. So you'll be able to show what a topnotch CICS programmer you are from the very first program you write.

**3. How to use CICS well** One reason CICS is complex in terms of programming is that there are often half a dozen CICS facilities you could use to solve a given problem. So to be an outstanding CICS programmer, you need a broad understanding of what facilities are available, how they're used, and how they interact. Then, you can choose the best solution for the problem at hand.

This course, particularly the *Part 2* text, is designed to give you that kind of understanding. As a result, you won't just learn the syntax of CICS commands...you'll also learn what's going on when a given command executes so you can make your programs as efficient as possible.

### No-risk guarantee

So there's no risk to you, *CICS for the COBOL Programmer* comes with my unlimited guarantee. These books must help you become the outstanding CICS programmer in your COBOL shop, or send them back for a full refund...no time limit. But first, try them FREE for 30 days.

Mike Murach & Associates, Inc., 4697 West Jacquelyn, Fresno, CA 93722 • (209) 275-3335

Mike Murach & Associates, Inc., 4697 West Jacquelyn, Fresno, CA 93722

**YES, Mike,** I want to master CICS. Please send me the items I've indicated below. I must be satisfied, or I'll send them back at any time for a full refund...no questions asked.

☐ **CICS for the COBOL Programmer, Part 1**, 326 pages, \$25  
☐ **CICS for the COBOL Programmer, Part 2**, 322 pages, \$25  
☐ **CICS Instructor's Guide**, 5 tabbed sections in a 3-ring binder with lab problems, tests, and transparency masters for both texts, 421 pages, \$75

☐ Bill me for the books plus UPS shipping and handling (and sales tax in California).

☐ I want to **SAVE** shipping and handling charges. Here's my check or money order for full payment. Calif. residents, please add 6% sales tax to your total. (Offer valid in U.S.)

Name & Title \_\_\_\_\_  
 Company (if any) \_\_\_\_\_  
 Address \_\_\_\_\_  
 City, State, Zip \_\_\_\_\_ C4/1

To order by phone, call 1-800-221-5528

(Weekdays, 9 to 4 Pacific Std. Time)  
 In California, call 1-800-221-5527

Please mention this ad code: C4/1

## TOP OF THE NEWS

### NEWS from page 1

AT&T officials told Daniel Rosenbaum, editor of "Wiretap" newsletter and a *Computerworld* columnist. AT&T developers reportedly could not achieve the right combination of screen readability, low cost and portability. The company would have persevered with its marketing plans for the laptop if it had landed the Internal Revenue Service laptop contract [CW, March 3] or if demand for laptops seemed to be increasing. AT&T would not comment.

**Intel Corp. announced Friday a second-quarter loss** of \$20.3 million, or 17 cents per share, on revenue that declined 15% from year-earlier levels to \$305.2 million. The figure included an extraordinary revenue gain of \$2.5 million. In the year-earlier quarter, Intel earned \$9.2 million, or 8 cents per share, on revenue of \$350 million. Chairman and CEO Gordon Moore said it will "continue to be difficult to make progress" because of excess semiconductor industry capacity and soft computer demand.

**Parallel Computers, Inc. of Santa Cruz, Calif.**, will introduce three machines in its series of on-line, transaction processing systems today. The new supermicro and minicomputer products are said to be hardware fault tolerant, with each critical component having a twin. Prices will range from \$21,000 to \$100,000 for the 200XR, 400XR and 500XR models.



## NEWS

# Elxsi says CPU, chip revamps will double 6400's power

## Processor compatibility key to memory boost

By James Connolly

SAN JOSE, Calif. — Promising its customers twice the previously available power, Elxsi plans to introduce today a central processor and denser memory chips for its System 6400 parallel multiprocessor.

The company said it will announce its M6420 CPU for field upgrades of its older M6410-based systems and for new System 6400s. Elxsi, a subsidiary of Trilogy Ltd., claims to have more than 70 of its systems, with configurations ranging from one

to 12 CPUs, installed in the aerospace industry, electronics firms, government laboratories, universities and the Unix marketplace. The company targets scientific and engineering markets as well as limited business applications.

Elxsi also plans to announce a quadrupling of the physical memory capacity of the System 6400 to 768M bytes and an increase in cache memory from 16K to 64K bytes. Trilogy President Gene M. Amdahl said last week that Elxsi also plans to use 1M-bit memory chips to increase physical memory to 2G bytes next year.

Elxsi President Peter Appleton-Jones said a key element of the announcement is the ability to add the

new processors to Elxsi's existing 320M byte/sec. system bus. "To our knowledge, this is the first time two processors using different designs have worked together on the same system bus with no hardware or software modification," Appleton-Jones said.

Appleton-Jones added that the M6420 has shown performance gains ranging from 1.7 to 2.3 times the earlier M6410, with a typical application mix running twice as fast on the new processor. He said the old and new processors, each consisting of a three-board set, can run on the same system with the M6410. Appleton-Jones rated the single-CPU performance of the M6420 at 10 million in-

structions per second.

The performance gains, according to Appleton-Jones, come from streamlining and increasing the performance of the instruction unit on instructions such as loads, stores and branches; increasing the cache size; improving the computerized instruction speeds in the execution unit; and software and firmware improvements.

He also claimed that the System 6400 provides a performance range that bridges the gap between the Digital Equipment Corp. VAX 8650 superminicomputer, which Elxsi claims the System 6400 outperforms by 10% to 50%, and the Cray Research, Inc. Cray-1 supercomputer, which Elxsi claims is comparable to a fully configured 12-CPU System 6400.

The cost to upgrade an M6410-based System 6400 to an M6420-based system is \$140,000. A two-CPU system with 32M bytes of memory costs \$475,000 with the M6410 and \$625,000 with the M6420.

One Elxsi user who learned of the announcement last week said his company probably will move up to the faster processor and denser memory. "We are going to have a 6420 fitted. We have just about used up the capabilities of our machine now, and we are looking forward to seeing whether it does give us the double performance," said Jeff Robinson, director of engineering for General Datacomm, Inc. of Middlebury, Conn. The company uses a six-CPU Elxsi system for circuit designs.

### Elxsi system 100 times faster

Robinson said the Elxsi system is 100 times faster than General Datacomm's earlier DEC VAX-11/785 for most applications and that the additional memory will provide users with more flexibility. "I don't see us buying any more cabinets or any more computers, although I do expect to add memory and swap CPUs in the cabinets that we have now," he added.

Robinson acknowledged that he had considered it a gamble to buy an Elxsi system two years ago because of the shortage of software for the machine. However, he said the ability to run Unix, as well as Elxsi's EM-BOS, allows access to a greater software library.

Trilogy's Amdahl previously said that his firm's merger with Elxsi was, in part, intended to provide the means to use technology developed by Trilogy. He reported that little Trilogy technology is used in the current System 6400, one reason being the recent agreement to sell Trilogy's packaging technology to DEC for \$10 million.

"That technology won't show up in our products for two or three years. The reason it will not show up is that at the time we sold it to DEC, we agreed to give them a two-year head start. Even if we had decided to use it ourselves — and we still retain the right to — it would have taken two years to implement it, so the most we would have gained is a year. Also, at this level of performance, there would have been a marginal gain in performance," Amdahl said.

Appleton-Jones noted that the greatest benefit to Elxsi from the Trilogy merger has been the cash infusion that Trilogy provided.

# A meeting of the minds.

September 29<sup>th</sup> and 30<sup>th</sup>  
Century Plaza Hotel, Los Angeles.

Ashton-Tate\* invites you to attend its first annual Developer's Conference, in Century City, Los Angeles, for a full slate of hard-core technical presentations and workshops.

It's a conference designed to help you explore and discover the state of the art in applications development. And influence Ashton-Tate's future product direction.

Choose from over 40 sessions on sophisticated dBASE\* and Framework\* development tools and techniques. Examine new design concepts with commercial and corporate programmers, experts from key add-on hardware and software companies, and Ashton-Tate technicians.

There'll be code clinics, where you can troubleshoot with the experts.

Live demonstrations of expanded memory, multi-tasking and micro-mainframe products. And sessions on new opportunities such as multi-user applications, networking and communications.

So you'll come out with the hard facts you need to fully extend the capabilities of your current applications. And a whole new outlook on future opportunities. Plus a firm belief in Ashton-Tate's commitment to developers.

Attendance will be limited, so register early. Call (800) 323-7616 for a detailed brochure and registration packet. In California, call (818) 707-0102.

 **ASHTON-TATE\***

20101 Hamilton Avenue  
Torrance, CA 90502-1319



8 of the top 10 computer manufacturers choose ORACLE.

Sperry to sell  
**ORACLE Relational**

**ORACLE DBMS**  
now runs on  
all AT&T computers

**ORACLE VM/CMS**  
install base grows

Oracle, Hewlett-Packard  
Sign Agreement

Stratus adopts Oracle's relational  
DBMS across entire system

**IBM to sell ORACLE on the System/88**  
line of fault-tolerant computers

**IBM to Market ORACLE Version**  
as SQL/RT on RT PC

Honeywell to Market  
**ORACLE**

**ORACLE Relational**  
**DBMS announced**  
for IBM PC

Oracle inks OEM  
pact with  
Motorola/Four-Phase

**Data General**  
**Offers ORACLE**

**Prime to Market ORACLE Relational DBMS**

When a computer company sets out to select a relational DBMS to include in its product line, it's a *strategic* decision. A decision about a long-term business partnership. A decision the company will live with for years. A decision that will drive many other decisions.

Throughout the 1980's, almost every major hardware manufacturer has invested time, energy and resources in evaluating DBMSs—to select the *best* product from the *best* company.

In each case, experts from the hardware manufacturer narrow down the field of DBMS vendors in an intensive evaluation. They compare functionality, reliability and security. They subject the DBMSs to excruciating benchmarks.

They test the software vendors' claims. They find out if the "IBM-compatible" SQL is *really* IBM-compatible... or is it just a "SQL-like" subset?

They evaluate support and development staffs for quality, responsiveness and depth.

And, invariably, ORACLE is chosen. Chosen by IBM. Chosen by Honeywell. Chosen by Stratus. Chosen by Prime. Chosen by Sperry. If you want to find out why 8 of the top 10 computer manufacturers choose ORACLE, join us for a free half-day seminar. Soon.

Call or write. Oracle Corporation, Dept. W8, 20 Davis Drive, Belmont, CA 94002, 1-800-345-DBMS.

# ORACLE®

Compatibility • Portability • Connectability

Call (800)345-DBMS today.

Ottawa (613) 238-2381 □ Quebec (514) 337-0755 □ Toronto (416) 362-3275

ORACLE U.K. (SURREY) 44-1-948-8376 □ ORACLE EUROPE (NAARDEN, THE NETHERLANDS) 31-2159-49344

© 1986 by Oracle Corporation. ORACLE® is a registered trademark of Oracle Corporation. SQL/DS, DB2 and IBM are registered trademarks of IBM. DEC, DS, ARI, Stratus, SP and Bell Laboratories are registered trademarks. TRBA.



## NEWS

## Cobol standard add-ons played

From page 1

During the next 30 days, members

of the X3J4 committee, who represent major compiler vendors and users in the U.S. armed services and the private sector, will cast their ballots on the question of adding "intrinsic functions" to Cobol. These would provide Cobol with mathematical functions now associated with the

Fortran language, such as the ability to calculate square roots and perform trigonometric calculations. Cobol currently possesses limited mathematical capabilities.

ANSI panel members agree that proposed features would improve the language. But several committee members fear the addendum process itself will pollute the standards process, resulting in a stream of approved additions that will confuse vendors and users alike.

Because the proposed additions were omitted from Cobol 85, the addenda — if approved in the upcoming balloting — will be optional for compiler writers. According to X3J4 committee members, writers can choose on their own whether to add the mathematical functions to the standard Cobol 85 language.

"The spirit of the addendum process was to allow you to add new features without going through a 10- to 15-year cycle. But the implementation has not been clearly thought out," says Lawrence K. Madison, committee member and data processing director at Travelers Insurance Co. in Hartford, Conn.

"I've been opposed to addenda," says Lemuel Skidmore, principal of Skidmore Resource Management in Clinton, Conn., and vice-chairman of the ANSI committee. Adding features on a spot basis strays from the committee's charter to make Cobol a more uniform language, he says. Each feature may be desirable on its own, but as compiler writers contemplate a growing list of optional addenda, "the implementation will be horrendous," he predicts.

The optional nature of the addenda is troubling even to advocates of the addendum process. If the committee detects an error in Cobol 85 and adopts an addendum to correct it, the question is whether that correction should be optional, says Bruce Gaader, a member of the committee and director of computer services at Macalester College in St. Paul, Minn. He is the representative of the Digital Equipment Computer Users Society on the committee.

Committee member Jerome B. Garfunkel of Garfunkel Associates in Litchfield, Conn., thinks the first step of the addendum process does not go far enough.

"The original addendum was much fuller. It's been chipped away by people who want to see this addendum process go away," he claims.

With both advocates and doubters on the committee, the fate of the initial addendum appears to lie with the vendor representatives, who occupy 14 of 21 seats. Some of them may be inclined to vote against the addendum, Madison says. If addenda were added regularly, vendors would be under pressure to constantly revise their compilers, he adds.

Skidmore, another user representative on the committee, says the issue of how often the addendum process will be used is a valid concern. "What had been a stable standard will start changing every few months," he charges.

The debate over addenda occurs at a time when many Cobol users are still trying to decipher how they will be affected by the changes incorporated into Cobol 85. Part of the reason is that few compiler vendors have yet to produce Cobol 85 products. They have until Oct. 1, 1987, to get Cobol 85 compilers validated by the General Services Administration, Garfunkel says.

As committee members explain it, the addendum process is an outgrowth of the Cobol 85 revision process. The goal of the Cobol 85 drafters was to reduce its ambiguities, add function and allow it to make use of modern, structured programming concepts, committee members agree.

The revision process was cut off in June 1978 to reach decisions on what was presumed at the time to be Cobol 80, later referred to as Cobol 8X, as a storm of negative comment dragged out the public review process.

Much of that comment was directed at features being added to Cobol that increased its portability but also increased its incompatibility with earlier versions of the language, committee members relate.

### A BIG OFFER CALLS FOR A BIG COUPON!

Contact Fibronics before you cable up! We'll save you money using the Fibronics Communications Freeway.

And, we're offering a FREE, customized network analysis for you!

HERE'S WHAT WE'LL DO: First, we'll visit your facility, look at your requirements and pin down what you'd like to do and when.

Then we'll discuss your needs with our team of on-premises network designers. Within two weeks we'll get back to you with a custom-engineered, color-keyed, computer-generated network plan. Your plan will describe our detailed design recommendations including complete equipment and installation pricing.

We're the experts in data, voice and video transmission over fiberoptic, coaxial or twisted pair cable. We manufacture, install and support what we sell. The Communications Freeway interconnects diverse interfaces and multi-vendor products.

So, we're challenging you to challenge us. If you want a system that is proven, safe, and extraordinarily cost effective... call Fibronics today! Call 1-800-DOUBLER or mail your coupon.

Name \_\_\_\_\_ Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City/State \_\_\_\_\_ Zip \_\_\_\_\_  
Telephone \_\_\_\_\_ Ext. \_\_\_\_\_

**Fibronics** International Inc.  
fiberoptic communications

Offer #CW71486

325 Stevens Street, Hyannis, MA 02601 U.S.A.  
Tel: (617) 778-0700 Telex: 951297 FAX: (617) 778-0821

For Fast Service:  
Call ICCP at 1(312)295-4227

## MEASURE UP TO EXCELLENCE! Certification of Computer Professionals



The Institute for Certification of Computer Professionals (ICCP) offers four certification programs. It also supports a recertification program to help you stay current with the state of the art.

Examinations are given twice a year. Exam sites are throughout the world.

Here are details on ICCP certification and a handy coupon to use to receive registration material, study guides and other information.

### Do It Today.

### Measure Up to Excellence!

#### When Are Exams:

There is a November 8, 1986 examination, with application deadline of October 1, 1986.

#### About the Offerings:

The Associate Computer Professional (ACP) Program is designed to assist two general groups of people. They are: Students or recent graduates from computer programs in one-, two- or four-year colleges; and people who have been working in the computer field only a short period of time.

The Certified Computer Programmer (CCP) exam offers three CCP specializations and a common general section. The three specializations are: Business, Scientific and Systems Programming.

The Certified Data Processor (CDP) exam is directed to senior-level personnel. Therefore, the examination is limited to those who have completed 60 months experience.

The Certified Systems Professional (CSP) candidates must have a minimum of 12 months of profes-

sional experience as a manager, consultant and/or project manager.

#### Recertification is Available Now

The CCP, CDP and CSP programs require that suc-

cessful candidates recertify their professional skills every three years. The ICCP recertification process may be accomplished by either retesting or through earning Contact Hours as approved by ICCP.

#### Study Guides Available

Official ICCP Study Guides for each of the programs may be purchased directly from ICCP. The cost is \$15 per copy for the CCP, CDP and CSP Study Guides. The ACP Study Guide is \$12.50 per copy in US dollars only.

<b>Charge Card Information</b>		Complete and send coupon to: ICCP, 2200 East Devon Ave., Suite 268, Des Plaines, IL 60018.	
Account Number		<input type="checkbox"/> VISA <input type="checkbox"/> MC	
Make check payable to ICCP or use charge card.			
<b>Study Guides</b>	<b>Applications to Take Exam</b>	Total Amount Enclosed \$ _____	
<input type="checkbox"/> ACP \$12.50 <input type="checkbox"/> CCP \$15.00 <input type="checkbox"/> CDP \$15.00 <input type="checkbox"/> CSP \$15.00	<input type="checkbox"/> Includes test Site, Exam Content Outline, Code of Ethics. <input type="checkbox"/> ACP <input type="checkbox"/> CDP <input type="checkbox"/> CCP <input type="checkbox"/> CSP	Name _____	
Cardholder's Name _____ Exp. Date _____		Street Address _____	
Signature (Mandatory on all charge orders) _____		City/State/Prov./Zip-Postal Code _____	
		Telephone _____	

## Xidex 3480-type cartridge to debut

By Donna Raimondi

SANTA CLARA, Calif. — Xidex Corp. this week is scheduled to announce tape cartridges for use in IBM's popular 3480-type subsystems.

The Xidex 34800 tapes, manufactured in Omaha at the site of the former Control Data Corp. Business Products Division that was acquired by Xidex in December 1985, will be in full production by August, the company said.

CDC and Xidex both had 3480-type tape products in the works when CDC was acquired, according to Bert Zaccaria, executive vice-president of Xidex.

"CDC was further ahead of us in development, and that is why we can start selling this in June," Zaccaria explained.

No tape drive system will be forthcoming, he added, as the company supplies storage media, not hardware.

The product will retail for a single-quantity price of \$20 per tape.



## NEWS

# Diet firm says Datagraphix blocking used COM sales

## Files suit alleging federal antitrust law violations

By Jeffery Beeler

**SAN FRANCISCO** — A firm's inability to sell a used computer output microfiche (COM) system has prompted that company to sue the equipment's manufacturer for allegedly violating federal antitrust and racketeering laws.

In a complaint filed in U.S.

District Court last month, Cambridge Plan International, Inc. (CPI) accused Datagraphix, Inc. of engaging in pricing practices that have effectively stifled competition in the aftermarket for its own used products.

The complaint, filed in San Francisco, also alleges breach of implied covenant and written contract by Datagraphix, the U.S.' largest COM hardware supplier and a subsidiary of General Dynamics Corp., a giant defense contractor.

Through its attorneys in

both San Francisco and San Diego, where its headquarters is located, Datagraphix last week declined to comment on the suit except to deny CPI's allegations and promise a legal reply at an undisclosed date.

CPI asked the court for \$65,000 in damages, which would automatically be trebled under federal antitrust and racketeering laws. The Pacific Grove, Calif.-based firm may also be entitled to punitive damages, the exact amount of which would have to be set by a jury.

### Scuttled attempts

CPI's breach-of-contract claims stem from allegations that Datagraphix deliberately scuttled the plaintiff's attempts to resell its used COM system to another user on the open market.

CPI, originator of the once-popular Cambridge Diet plan, said in its suit that it had tentatively persuaded a neighboring user, the Santa Cruz County government, to buy the hardware for \$65,000. But the county later balked at the deal when Datagraphix demanded \$43,285 to transfer the machine's maintenance agreement to the prospective new owner, according to the complaint.

The fee, which the vendor purportedly required for the system's refurbishment, struck CPI as excessive for a damage-free unit that had seen less than 200 hours of use, the complaint said.

Datagraphix's actions in the CPI case form part of a nationwide pattern of activity calculated to monopolize the firm's share of the used COM equipment market, the court document alleged.

To support its contention, CPI cited two instances in which other user organizations reported similar problems in unloading their used COM systems because of Datagraphix's steep refurbishment charges. One of the companies is National Business Systems, Inc., a Minneapolis-based COM service bureau.

"We have a couple of pieces of used Datagraphix equipment sitting in our warehouse right now," said Joe Tafs, general manager of National Business System's COM division. "We really haven't even tried to sell the machines because we've learned the hard way that Datagraphix would charge the buyers \$30,000, \$40,000 or \$50,000 to transfer the maintenance agreements."

For the money it would have to spend to buy an old COM system and transfer the all-important maintenance agreement, a user organization could probably acquire a late-model unit fresh from the factory.

So in part, the intent behind Datagraphix's pricing policies is apparently "to entice companies to buy new equipment rather than used," Tafs said.

"If CPI's experiences are typical, Datagraphix has managed to insulate itself from competition in the secondary market and can dictate almost any price or availability terms it wishes," according to the plaintiff's attorney, James Gilliland.

At the heart of CPI's complaint is a Datagraphix Model 2280 COM system that the user bought for \$154,000 in November 1982. But after September 1983, when business soured and CPI declared bankruptcy, the company decided to liquidate many of its assets, including the COM

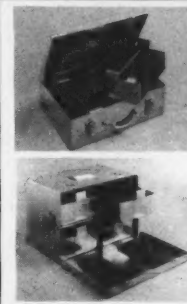
equipment, to pay off its creditors, Gilliland said.

In spring 1985, when CPI finally found a prospective buyer for its system, two Datagraphix technicians were dispatched at Santa Cruz County's request to inspect the merchandise, which by then was lying in storage.

Although the inspection took less than a day, it cost \$2,500, which "is grossly in excess of the \$200 to \$500 charge for certification inspections of computer equipment," the complaint said.

After a delay of several weeks, Datagraphix initially sought \$98,000 to transfer the equipment's maintenance agreement to the county and then lowered the figure to \$43,285 when the potential buyer protested.

## ALUMINUM 3480 Cartridge Cases



### HEAVY DUTY - COMPACT

Model No.	Capacity
5030	1 to 20 Cartridges, removable tray included, 13 x 9 1/2 x 5 1/4
5031	1 to 40 Cartridges, 2 removable trays included, 19 x 13 x 5 1/4
5032	1 to 80 Cartridges, 4 removable trays included, 19 x 12 1/4 x 12 1/4

All above units include removable 20 capacity ALUMINUM trays

5106	1 - "20 Pack" Plastic Tray (tray not included) 16 x 13 x 6
5107	2 - "20 Pack" Plastic Trays (trays not included) 25 x 14 x 7

See your local dealer, or call/write — DIVISION OF BY-LONG INC.

**ALUMINUM CASE CO.**  
3333 W. 48th Pl. • Chicago, Illinois 60632 (312) 247-4611



**IBM DRIVING YOU CRAZY WITH SDSF??**

**REPLACE SDSF AND ISPF 3.8 WITH FLASHER**

**FULLY SUPPORTED ALL THE TIME**

- |  |   |
|--|---|
| <input type="checkbox"/> INSTANTANEOUS JOB RETRIEVAL | <input type="checkbox"/> MENU JOB SELECTION   |
| <input type="checkbox"/> ISSUE OPERATOR COMMANDS     | <input type="checkbox"/> VIEW ACTIVE SYSLOG   |
| <input type="checkbox"/> SELECT INDIVIDUAL DATASETS  | <input type="checkbox"/> ON-LINE HELP SCREENS |
| <input type="checkbox"/> VIEW JOBS IN EXECUTION      | <input type="checkbox"/> DISPLAY LINE COUNT   |
| <input type="checkbox"/> SELECT MULTIPLE JOBS        | <input type="checkbox"/> REAL SPF/ISPF BROWSE |
| <input type="checkbox"/> JES2 AND JES3               | <input type="checkbox"/> SECURITY             |

FOR ADDITIONAL INFORMATION OR FREE TRIAL CALL:

1-800-833-8663  
OR  
714-991-9460  
in Calif.

**TONE**  
Software Corp.  
1736 S. Brookhurst  
Anaheim, CA 92804

## DEC

### RENT • RENT • RENT • RENT

**"IT PAYS TO KNOW YOUR RENTAL OPTIONS BEFORE YOU PURCHASE A VAX® SYSTEM OR PERIPHERAL"**

**DON'T DELAY, CALL US TODAY!**

**MICROVAX II** (System Configured to Your Requirements) **\$995\***

\*assuming 12 month rental term

**BROOKVALE ASSOCIATES**  
Your source to buy, sell, lease or rent Digital products.

**WEST COAST: 800-252-6200**  
In WA 904-206-392-9878  
1495 N.W. Gilman Blvd., Portland, WA 97209

**EAST COAST: 800-645-1167**  
In NY 516-273-7777  
1000 Old Country Rd., Hauppauge, NY 11788

**TWX: 510-228-7319**

DEC, VAX & PDP-11 are registered trademarks of Digital Equipment Corp.

## BUILDING A COMPUTER CENTER?

If you're planning a new, expanded or remodeled DP facility, you need Datasphere's help.

Since 1968 Datasphere's unique combination of services has saved dollars, frustration and time for large and small firms around the world.

From turnkey—design/build computer rooms to consultation on the smallest project, we'll do all or part—on schedule, within budget! Datasphere is unique—we're engineers, consultants, planners and builders specializing in computer facilities.

Datasphere's engineers are expert in all computer support systems including:

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Uninterruptible Power Systems</li> <li>• Computer Power Centers</li> <li>• Computer Fire Protection Systems</li> <li>• Computer Type Air Conditioning</li> <li>• Gas Turbines/Diesel Generators</li> <li>• Operation Command Centers</li> </ul> | <ul style="list-style-type: none"> <li>• Elevated Flooring</li> <li>• Frequency Converters</li> <li>• Line Filters</li> <li>• Security Systems</li> <li>• Systems Monitors</li> <li>• Voltage Regulators</li> </ul> |
|--|---|

## CALL DATASPHERE

**800-221-0575**

IN NEW JERSEY CALL: 201-382-2300

**datasphere, Inc.** 1255 Westfield Avenue, Clark, New Jersey 07066



## NEWS

## Micro execs' role changing

From page 1

much more expendable, many observers say.

Some managers predict that if an economic downturn prompts businesses to cut expenses, the micro manager's job will be among the first cut, because the major tasks have already been accomplished.

Therefore, many micro-computer managers and con-

sultants agree that it is time for managers to expand their horizons.

Some former micro managers who have become consultants now strongly urge other managers to acquire those crucial business skills. One such consultant is Randy Casto, president of the Casto Group, Inc., based in Overland Park, Kan.

"The information center manager today must have business acumen to understand not only what the technology can do but also how it directly relates and contributes to the company,"

Casto says. He stresses that this is true whether the manager is involved with micro-computer and mainframe computing or just PCs.

Typically, in the "novelty period" — the first 12 months of an information center's existence — the manager has "pretty much an easy time," Casto says.

But in the following "corporate contribution period," the manager is required to show that his center is indeed an asset to the company's overall direction.

So that managers will be prepared for this second stage and the final "maturation" stage, Casto urges them to understand their companies' business goals early on.

Wholeheartedly agreeing is Hilarius Fuchs, information center director at Continental Grain Co. of New York. Fuchs holds a doctorate in agricultural economics, and his second-in-command lends financial expertise gained from working in the controller's department.

"Our emphasis here is to

move away from rebuilding the same old financial, payroll and human resource systems again and again to make them faster, nicer and smoother," Fuchs says. "They don't do very much for the bottom line. What we're emphasizing is those projects that impact the bottom line. The questions are, How can we make more money? How can we save money for the company?"

Consequently, Fuchs and

role in Coca-Cola's strategic direction.

"It's just fun to ride that trend to its natural conclusion," he adds.

But while Grimsley and many of his peers are convinced that they need to take an active role in their companies' businesses, some managers maintain that the microcomputers alone will keep them busy indefinitely.

One senior office systems supervisor at a financial services company says that in the future, she should have her hands full keeping track of new product developments, a growing number of microcomputers within her company and a deluge of training requests.

"Once people get trained, they want advanced courses," she says. "They want more. If they're in Lotus' 1-2-3, then they want a data base course. Also, there's a constant influx of new people who need to be trained. Our waiting list for training is never less than 30 or 40 people."

She adds that users' steadily decreasing reliance on programming staffs translates to more work for micro-computer groups like hers.

### Business techniques

Along the same lines, some microcomputer managers say that in particular businesses such as brokerage, the rule is to learn general business techniques rather than specifics.

This is because mainframes usually handle the specific business functions, while microcomputers are used in back-office jobs such as accounting, says Bob Duste, information center manager at Charles Schwab and Co. of San Francisco.

"I don't think it matters too much whether we're in the financial business or the banking business or the airline business," Duste says. He stresses that accounting, finance and cash control departments perform similar business functions regardless of the industry.

However, if a microcomputer manager should have a need to become more involved in his company's particular business, he should not panic, some managers say. "I think it's easier to get the business skills than it is to get the technical skills," observes Donna Dufner, information center manager at Manufacturers Hanover Trust Co. of New York.

"If a person has a technical aptitude and training and is bright," Dufner says, "we can usually teach him the business skills, because they are analytical skills, only with a different perspective. But to take somebody with a business background or sociology or psychology and try to teach them the conceptual data processing is very complicated."

## ”

**'The information center manager must have business acumen to understand not only what the technology can do but also how it directly relates and contributes to the company.'**

— Randy Casto  
Casto Group, Inc.

## NETWORK PERFORMANCE MEASUREMENT

NETSPY™ is the most complete VTAM Network Performance and Response Time Monitor for MVS and MVS/IXA

- Resolve network delays
- Maintain user service agreements
- Graph historic trends
- Problem determination
- Network tuning
- Capacity planning
- On-line and batch reporting
- Build performance database

For more information or a 30-day trial call (312) 525-6400

*ChicagoSoft*

738 N. LaSalle St.  
Chicago, IL 60616

## CHANNEL SPEED + ASCII ECONOMY

Are Yours With

**HYDRA®**

A

Direct

Channel Attached

Protocol Converter/Controller

**Maximize** response efficiency by by-passing additional controllers or front-end processors

**Increase** operator productivity with "key ahead" and pre-defined keystroke sequences

**Economize** by eliminating costly remote software - all devices appear local to the host

**Save** by attaching inexpensive ASCII terminals that appear as 3270 devices to the host

**Utilize** serial ASCII printers to function as 1403/3211 system printers or 3286/87 printers

**Improve** terminal efficiency with quick screen updating that replaces changed data only

**Expand** by adding a wide variety of ASCII devices such as PCs, plotters, bar code readers, document scanners and more!

**Communicate** from your branch office, home or anywhere in the world using dial-up or leased lines

**Upgrade** easily as your needs grow from 8 to 64 ports. Available in table-top or rack-mount models. HYDRA attaches to IBM 380, 370, 430X, 300X or compatible mainframes.

**Call for your closest HYDRA Dealer** and full details on how HYDRA can benefit YOU.

**Call 800-55-HYDRA today!** In California call (714) 770-2283.



**JDS MICROPROCESSING**  
22901 Lamfield Street, Suite 200, El Toro, CA 92630

\* a company dedicated to service and support \*

his staff must be concerned not only with computers but also with such corporate essentials as cost structures, the ability to move products around quickly and the ability to obtain products to full-fill contracts.

This business awareness is particularly important in the time-sensitive grain business, Fuchs says. "In a lot of businesses, if you're a little bit late getting the information to the people, they'll say, 'Okay, fine. We can still use it.' But in the grain business, if a merchandiser making a deal doesn't have the information available to him to make a bid on a contract, and he doesn't feel comfortable making that bid, that contract doesn't come back again. You've lost the business."

### Coca-Cola's micros

Such is the case at Coca-Cola USA in Atlanta, where a staff of 10 administers some 500 microcomputers. "We want to make the company more effective, not just more efficient," says John Grimsley, manager of end-user computing.

Toward that goal, everyone on Grimsley's staff has a business specialty, such as bottling, fountain service and finance. Because the staff members spend most of their time in the specific user departments, they sometimes move on to become members of those departments.

Although Grimsley has a systems analysis background on the fountain service side of the business, he intends to stick with microcomputers. He says he feels that as personal computing continues to evolve, microcomputers should play an even bigger



## NEWS


**WORLD DIGEST**  
 Computeworld  
 News Service

**MUNICH, West Germany** —

Karl Heinz Beckurts, vice-president of the Research and Technology Department at Siemens AG, was killed last Wednesday morning by a bomb blast on his way to work in Munich. Red Army faction terrorists claimed responsibility for the bombing. Beckurts, 56, had been director of the Institute for Applied Nuclear Physics and president of a nuclear power research institute before joining Siemens in 1980.

**AMSTERDAM** — TPM Europe

acquired Business Solutions International from Control Data Corp. as a first step toward creating a European network of third-party maintenance companies. The firm supports hardware from most vendors but specializes in Digital Equipment Corp. and IBM environments, according to Managing Director John Stancioff.

New offices will be announced in London in September, in Paris in October, in West Germany in January 1987 and in other European countries later, he added.

**TOKYO** — After waiting for

a year and a half, Fujitsu Ltd. now plans to begin construction of a semicustom chip plant in Gresham, Ore., within the year. The facility will reportedly be operational by mid-1987 and will produce gate arrays and standard-cell integrated circuits.

Fujitsu reportedly will initially invest between \$18.7 million and \$25 million in the plant, which is Fujitsu's second U.S. manufacturing facility.

**BEIJING** — The People's

Bank of China has purchased two Burroughs Corp. A 3 mainframes and supporting peripherals for a branch office and a provincial headquarters. The deal is valued at \$1 million. Other sales may also be in the offing for mainframe vendors; the bank is considering installations for branches in 14 cities. Hitachi Ltd., which already has several installations at the bank's headquarters in Beijing, may be the leading contender for those contracts.

**TOKYO** — Hitachi Ltd. has

acquired the manufacturing and sales rights in Japan for Cupertino, Calif.-based Fairchild Semiconductor's FACT high-speed CMOS logic devices. Hitachi is set to deliver samples beginning in late 1987. According to Hitachi, some Japan-produced FACT products will be shipped to the U.S. market. FACT currently is being produced in Japan by Nippon Fairchild K.K., a Fairchild subsidiary.

**TOKYO** — A group

composed of Nippon Telegraph and Telephone Corp. and eight other Japanese behemoths will join forces to establish a research firm for space communications in October. Some \$62.5 million will be funneled into the new venture over the next 10 years to develop vital equipment for trailblazing satellite and mobile communications technologies.

Tentatively named the Space Communications Development Co., the planned firm includes representatives from Kokusai Denshin Denwa Co., Japan Broadcasting Corp., Toyota Motor Corp., Tokyo Electric Power Co., Toshiba Corp., Mitsubishi Electric Corp., Hitachi Ltd. and Fujitsu Ltd.

**ZURICH** — Swiss DP managers

spend 40% of their departmental budget on personnel, 25% on hardware, 10% on maintenance and 8% on external software purchases, according to a recent survey of computer use by corporations in Zurich. The survey also found that 8% of the DP budget went for external data processing.

The study said the Swiss spent from \$6.5 billion to \$8.6 billion on data processing in 1985. Overall mar-

ket growth reached only 22% in 1985, substantially less than the 54% growth recorded in 1983.

**TOKYO** — Sluggish Japanese

demand and a continuing decline in exports combined to cause Japanese production of telecommunications gear to decline 1.5% in April from its level one year earlier. Japanese telecommunications hardware production in April totaled \$829 million. Exports of such products were down 6.9% to a total of \$291 million.

**LONDON** — Ministers from

the 18 countries involved in Europe's Eureka program agreed earlier this month on a list of 58 new research and development projects, bringing the total investment of the governments and compa-

nies involved in the joint European high-technology research effort to more than \$2 billion.

Projects dealing with software, robotics, communications, expert systems, industrial automation and chip technology dominate the list of new programs approved by 40 ministers from the participating countries. The group also voted to let Iceland join Eureka.

**SHANGHAI** — China entered

the diskette business in late June with a diskette production line at an electronics plant in Shanghai. The first production run of 200,000 floppies shipped to Hong Kong. Chinese officials claim their floppies are near equals of 3M Corp.'s standard-setting product. The Shanghai plant reportedly can make 9.6 million diskettes per year.

## Who is accessing your VTAM Network tonight?



With THE NETWORK DIRECTOR, access to your VTAM Network can be based on User Id and Password, not just terminal location.

The Network Director can require the terminal user to enter a User Id and Password before allowing the user access to VTAM applications.

Once the user enters a User Id and Password, The Network Director verifies the user's identity with your security



package (ACF2, RACF, TOP SECRET or The Network Director) and then presents a Selection Menu of only those applications that the user is allowed to



access. In addition, access to applications can be further restricted by terminal, time or day.

When the user makes a selection, The Network Director can pass the User Id and Password to many applications (CICS, IMS, TSO, IDMS, CMS, ROSCOE, Com-plete, and MODEL 204, for instance) to automatically sign-on the user to the application.

The Network Director can keep an audit trail of sign-on attempts, the duration

of each user-application session, and more.

For physically secured terminals, a Selection Menu can be presented without requiring identification, and for dial-up terminals the initial screen need not identify the computer installation.

At a VTAM network level, The Network Director also offers bulletin board and help, message switching, broadcast, automatic application status, and network administration facilities.

The Network Director is available for MVS, VSI, or VSE environments (GCS soon) and fully supports cross domain, ENA, and SNI.

For more information contact North Ridge Software at 206/455-9809, TELEX: 328-951 (BUS SER BVUE).

### THE NETWORK DIRECTOR

(Please fill in or attach business card)

☐ I'm interested in a trial of THE NETWORK DIRECTOR

☐ Please have one of your specialists give me a call

☐ Please send me more information

Name \_\_\_\_\_ Title \_\_\_\_\_ Address \_\_\_\_\_

Organization \_\_\_\_\_ City/State/Zip \_\_\_\_\_

CPU(s) \_\_\_\_\_ Operating System(s) \_\_\_\_\_ Area Code/Phone/Extension \_\_\_\_\_

North Ridge Software, 10900 NE 8th Street • Suite 900 • Bellevue, WA 98004 • 206/455-9809

The following are proprietary software products of:

International Business Machines VTAM, CMS, CICS, IMS, TSO, RACF	S&K, Inc. ACF2	CGA TOP SECRET	Caltech IDMS	Computer Corporation of America MODEL 204	ADR, Inc. ROSCOE	Software AG Com-plete
--	-------------------	-------------------	-----------------	--	---------------------	--------------------------

CW 7/14/86



# VIEWPOINT

## EDITORIAL

### Keeping Cobol alive

Any language must grow, change and adapt to its evolving environment if it is to survive, and programming languages are no exception. Such change has been slow and painful for the old-timer among programming languages, Cobol. Since its birth in 1959 — spawned by a consortium of vendor and Pentagon officials seeking greater software productivity and portability — the world of commercial data processing has been totally reshaped.

Yet efforts to change Cobol have been slow and laborious: Its last major revision — Cobol 85, the successor to Cobol 68 and 74 — took 11 years to gain approval from the American National Standards Institute and the International Standards Organization.

Why? A controversy stemming from Cobol 85's perceived incompatibility with earlier standards for the language sidetracked the process for years. The data processing community wanted more easily maintained, more structured and more portable Cobol, but it didn't want compatibility problems. The result: a certain schizophrenia among MIS managers and the members of the standards committee.

To avoid such wrangling and to speed up revisions, standards-setters last year attempted to reform the approval process by using addendum: Essentially, Cobol will now be given new features, or addenda, every two or three years, and the language will be fully overhauled every decade. Introducing as addenda those changes likely to be included in the next full version of Cobol gives users and vendors a chance to get accustomed to them before they're adopted.

This week begins the initial test of the addenda process, as the ANSI committee responsible for changes in Cobol votes during the next 30 days whether to add certain mathematical features to Cobol.

All of this sounds good. Who wants to argue with an effort to more quickly update a language so important to the data processing community? The rub comes, as always, in the implementation. As the list of addenda grows longer, how do you prevent widespread confusion among software vendors and users, particularly since the addenda are optional?

We come down on the side of those critics, including some standards committee members, who argue that the whole addendum process causes more problems for the data processing community than it solves, that an evolving standard is no standard at all. Sooner or later, users, vendors and standards groups are going to have to decide whether they want compatibility with the earlier versions of Cobol or an upgraded language.

Given those choices, it seems clear that the data processing community must have an upgraded Cobol and a reasonable, timely revision process that guarantees it. Age is no reason for Cobol to grow feeble and die; neither is an unwieldy, ineffective revision process, one that ironically may be the biggest threat to the language it is supposed to renew.



## LETTERS TO THE EDITOR

### AT&T reports no such error rates

David Bendel Hertz, in his article on SDI software reliability, "SDI demands trillions of instructions, 99.99999999 reliability," [CW, June 2] cites "an AT&T report . . . that there were an average of 300 'serious errors' in every 1,000 lines of code at some 200 major corporate installations."

AT&T has produced no such report. Hertz may have obtained the data from an article that appeared in the Nov. 26, 1984, issue of *Computerworld*. Referring to a study by T. Capers Jones III of the Nolan Norton Co., the article cited those exact figures.

Our own experience is far different. We continually collect data from more than 70 AT&T projects, some involving millions of lines of source code, and we have documented an average error rate of less than one per thousand lines of source code.

In addition, with existing techniques of error checking, fault recovery and redundancy, a software system can deliver reliable performance though it may contain some errors.

**Edward Fuchs**

Director

AT&T Bell Laboratories Quality Assurance Center  
Holmdel, N.J.

### User effort prompts vendor action

The story, "Users await protocol fixes," [CW, May 19], refers to the reluctance of some companies to commit to Manufacturing Automation Protocol (MAP). The article states that many manufacturers are waiting until the factory communications standards are more complete.

This waiting game that we Americans play is dangerous and foolish. It is dangerous because by waiting, rather than acting, we are slowing down the very process that will result in complete standards. This process is called participation. Until users begin to commit themselves, vendors will not produce the products. Until vendors produce the products, the users will not commit themselves. Nobody seems willing to take the risk.

The Japanese are gaining more and more market share because they are willing to invest in the long term, often for much smaller productivity potentials than MAP has to offer. We Americans have a chance to commit to a long-term investment that will initiate a snowball of automation capabilities.

If ever there existed potential for long-term profit, it does now.

The sad part is that, although there are some holes in the MAP standards, there is still a lot a manufacturer can do today to prepare for tomorrow. For example, MAP will use broadband cable; we can start installing this cable. Also, there are several vendors today that offer ready-to-use products that will allow you to receive the benefits of MAP right now.

If you cannot commit your company at this time, you can at least help in other ways. If you do not send anybody to the MAP users group meetings, do so now. And when you are there, instead of complaining about what is not complete, how about committing your time or energy by contributing ideas or by attending a subcommittee meeting? The more effort that users make in this direction, the more action we will see from vendors.

**Frank K. Welch Jr.**

Consultant

SEI Information Technology  
Los Angeles

### Don't write off Datapoint yet

I am constantly amazed at the imagination your writers and editors display in your special reports. The way you routinely manage to develop articles on minicomputer installations, local-area networks and office automation integration without mentioning Datapoint Corp. is an incredible example of seeking facts with your eyes shut and minds closed.

As a Datapoint user of 10 years' standing, I can affirm the excellence of its hardware, operating software, communications protocols and customer education and support. Its product lines have easily accommodated our successful growth in business and have met every DP need we have had. We are confident Datapoint will continue to support all of our future needs as well.

You are doing a disservice to the industry and to your readers by neglecting to include Datapoint products and customers in your research and special report presentations. Don't write Datapoint off yet — it is still an innovative leader in its marketing area.

**Cynthia Casentini**

Director of Data Processing  
Hayward Lumber Co.  
Salinas, Calif.



# VIEWPOINT

## Piecing together the IBM product puzzle

The National Computer Conference's occasional sojourns in Las Vegas are an ideal opportunity for high tech to meet high tack. But the 1986 NCC barely met the qualifications. With only 400 exhibitors (and almost no minicomputer or personal computer software vendors of note), there wasn't very much high tech. The tech-to-tack ratio got out of hand.

But IBM came to the rescue, opening its cornucopia on Monday morning, right at the beginning of the four-day show, to announce 124 products and product enhancements.

The Big Blue Las Vegas blizzard follows IBM announcement extravaganzas, which were nearly as large, in January and April. It has occurred to us that this is an IBM plot. We can just hear them up in Armonk:

"Those consultants are really giving us a hard time, always complaining about what we haven't announced yet. We need to find something to keep them busy."

"Why not have more announcements?"

"You mean [shocked tone] give them what they're asking for?"

"No, no. I just mean announce so many things that they can't figure out what we're doing."

"Do we have enough stuff to announce?"

*Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.*

"Are you kidding? We always have stuff to announce. Besides, it's not so much what we announce; we just have to package it up so every announcement has lots of complicated little pieces. And then we'll mix up all the pieces and put them back together in really illogical ways. It will drive them crazy..."

Of course, that couldn't have really happened. But the result might be the same:

• The press is having a terrible time trying to figure out exactly what IBM has done or whether it is significant. This means that people who are very busy, very junior or very lazy will rely on statements from IBM executives as to what really happened, rather than try to study announcements that are too long and complicated to read, much less analyze and understand. They'd like the consultants to help them out, but...

• The consultants are spending all their time trying to figure out what IBM did, what was changed as a result and what they should tell their clients to do. This is akin to trying to figure out whether the Senate or the House version of the tax bill will pass and what to do with your real estate investments in the mean time. Of course, the consultants have almost no time at all to criticize IBM for what it hasn't announced yet; in fact, they're afraid to assume that anything hasn't been announced — may-

be it's buried in all that paper.

• The customers aren't sure of what is going on. On one hand, their favorite vendor is doing a lot of something, which means more choices, and everybody knows that's good. On the other hand, their favorite consultants seem very busy, and they're not sure what that means.

Now, if this works just right, the consultants and the press will be so busy explaining things to each other and pondering the announcements' importance that the customers will have to buy things on their own, from the very best marketing organization in the world. Guess what — they'll probably buy something for the sweet relief of having it over and done with!

### Setting a precedent

Then we'll have set a precedent. All the other vendors will play copycat and put together their own 156-item announcements. Can you imagine the press and the consultants having an extended powwow to discuss a 300-page Spurrings announcement? The news sections of every trade journal will blow their page budgets — and I'll need to buy five more filing cabinets.

What's a customer to do?

Keep the faith and depend on common sense. Big fat announcements aren't necessarily any more important than lots of little announce-

ments. The right question to ask is, What really happened here and, Did anything I really care about change?

In fact, the smart customer throws those questions right back to the vendor. Let him who wants to sell you something explain what he now has to sell — and why you should purchase it.

If you like to keep score on your own, here's how:

• Divide up the announcements by product and/or subject areas. And immediately put away the ones you're not interested in.

• Look at the areas you're interested in tracking. Look for promises being fulfilled, new products you weren't expecting, things that provide platforms for activities that interest you.

If you suspect something important happened, check it out with an editor at your favorite newsletter or trade publication. The smart analysts aren't fooled at all — and they know how to read this stuff. In fact, being a fast, smart reader is a requirement for the job.

You'll want to tune into that level of insight if you need to make (or remake) decisions quickly — or if one of the announcements was in an area that directly affects your information systems strategy. Otherwise, just wait. In a summer in which the computer industry is slowly recovering from a slow year, there will be plenty of time to analyze, reanalyze and finally understand just what the Blue Giant is up to — and whether you need to do something about it.



By AMY WOHL

## Computer monitoring: Boon to employee and manager?

Automatic measurement of work done on a computer can be an effective management technique. By counting, for example, the number of checks processed, the number of customer accounts corrected or the number of keystrokes entered into the computer, an automatic measuring device can help managers to set reasonable productivity goals, identify problems, price products and services and reward high-achieving employees.

Computer work measurement can also help employees meet their own and their employers' goals.

But like many new steps in workplace technology, "computer monitoring," as this measurement is termed, has become controversial. Opponents emphasize its potential for decreasing employee morale and increasing stress and are introducing bills into state legislatures to outlaw any measurement of work done on a computer.

### Legitimate gripes

While computer monitoring is not substantially different from the familiar manual procedures that measure the quantity and quality of

work, there are some legitimate employee gripes about the way some monitoring systems are used:

• When measurements are taken over short periods of time, employees may be subject to undue stress. For instance, while the vast majority of employees might be able to meet a goal expressed in terms of number of keystrokes per week, few of them would be able to meet that goal comfortably if they were required to enter the hourly average of keystrokes every single hour.

Energy levels vary. Some employees may need to work faster in the morning and more slowly in the afternoon. Or some might encounter a particularly difficult task that requires more time. Thus, goals should be established that allow each employee to vary his speed.

• There is a fear that monitoring can be used for "speed-ups" where employees are required to do more work with no increase in pay. While there has been no publicized case of a manager increasing keystroke quotas without compensation for data entry workers, such an action certainly could occur.

Unless original production goals were well below national norms, or unless new work flow techniques

made additional productivity possible, such speed-ups would be counterproductive and would anger employees, whose output quality would most likely plummet.

### Advantages outweigh abuses

But the many advantages of monitoring productivity clearly outweigh the theoretical abuses. Many organizations use monitoring to provide incentive pay for data entry operators who produce above a minimum expected output.

Employees then regulate the speed at which they work to meet their desires for additional pay. There are other advantages: The

computer is fair. It shows no favoritism. In addition, managers appreciate the fact that computer monitoring allows them to spot problems early in their origin and to react by offering additional training or individual assistance.

Nonetheless, a campaign is under way to prohibit computer monitoring. Such pressures are as senseless and as economically counterproductive as would be a campaign to prohibit quality control in the manufacturing process.

Critics of computer monitoring cite the several European countries

that prohibit the gathering of individual productivity figures. But such a prohibition is yet another example of the labor and managerial rigidities that consistently undercut European prosperity.

### American entrepreneurial values

Far from rekindling the oppression of the sweatshop, the modern concept of quantity control through computer monitoring has the potential for bringing some traditionally American entrepreneurial values back into today's workplace: workers have greater flexibility in determining their own production schedules; workers and supervisors can deal with each other as individuals rather than simply as "labor" and "management"; a worker is compensated beyond a respectable base wage for additional skill and effort; and promotions and rewards can be objectively determined without regard to race, religion or other bias.

In summary, computer monitoring cannot be discussed simplistically like another example of "man vs. machine." Quite the contrary.

To the extent that it accelerates the trend toward personal initiative and flexibility in the workplace, computer monitoring should be accepted as yet another technical improvement in U.S. competitiveness that can benefit U.S. employees.

*Henriques is president of the Computer and Business Equipment Manufacturers Association.*

### READER'S PLATFORM

By VICO E. HENRIQUES



# QUICK!

**Name the fastest  
VM dump restore,  
and the fastest  
VM sort program.**

**(SYBACK & SyncSort CMS.  
What took you so long?)**

**Call (201) 930-9700.**

**Meet our super-  
sonic systems.**



**syncsort**  
INC.

If you didn't choose SYBACK and SyncSort CMS as the fastest in their categories, *do not* go directly to jail. But read this very, very carefully.

**SYBACK, our fast dump restore for VM systems, and SyncSort CMS, the only high-technology sort for VM/CMS, represent a great technological leap forward. No other programs of their type can provide all three of the following positive advantages:**

**(1) THE FASTEST VM PERFORMANCE:** SYBACK and SyncSort CMS make data move like greased lightning. Compared to their "competitors," these programs can save a tremendous amount of computer resources:

- **50% in Elapsed Time;**
- **45% in VTime;**
- **55% in TTime;**
- **75% in SIOs.**

These savings are the result of our exclusive Fluid Buffering Technique (FBT) First developed in OS and DOS sorting, we've now extended the benefits of FBT to VM backups and sorts.

**(2) THE BEST VM PRODUCTIVITY:** SYBACK and SyncSort CMS have tremendous operational flexibility and user friendliness. They're rich in features designed to reduce human intervention in backup and sorting:

• **SYBACK**—Automatic backup based on CP directory • Stand-alone restore capability • Incremental backup facility • Catalog of backup operations • Multi-tasking and execution under CMS • Interactive command processing • Standard-label tape support • Callable by user programs • DASD to DASD conversion and copying. Much, much more.

• **SyncSort CMS**—Sorts CMS, SAM (OS or DOS), or VSAM files • Can be invoked from COBOL, PL/1 or BAL programs • Dynamically allocates disk space • Selects relevant records for sorting • Reformats records on output • Performs summaries of designated numeric fields • Produces reports with pagination, headings and dates • Can often produce simple reports in one day rather than, say, five. Much more, too.

**(3) THE FINEST TECHNICAL SERVICE:** Our Technical Service specialists are experts in their individual fields. You can count on fast, efficient, courteous service in both backup or sorting operations. More than 85% of all user requests for service are resolved within 24 hours.

**CAVEAT EMPTOR:** As with all performance software programs, the best way to find out what SYBACK and SyncSort CMS can do is to benchmark them yourself against your present programs.

That should help you make up your mind *fast!*

Syncsort Incorporated 50 Tice Boulevard, CN18, Woodcliff Lake, N.J. 07675



# SOFTWARE & SERVICES



**SOFTLINE**  
Gary Robins

## Technical edit cause of delay

**I**f I were a manager responsible for the development of application software, I'd pay close attention to the technical editing of the application's documentation.

I wouldn't be so concerned as to whether the resulting documentation was accurate — for the most part, final documents are accurate. I would be concerned, however, with the amount of time the technical editing process delays the project.

The familiar cry of "Documentation is late again!" may be factual, but the shrewd manager may be able to see through this statement and point to a lack of control in the technical review process.

The technical review process is a neglected area that often adds weeks to the length of a project. For the uninitiated, the technical review process can be briefly explained in four steps: a writer finishes a draft; the writer distributes copies of the draft to the programmers and project leader to be reviewed for technical accuracy; the programmers and project leader return the copies of the draft with their corrections to the writer; the writer incorporates the corrections. There are minor variations from company to company — there may be formal reviews of the corrections — but the sequence is basically the same. The purpose of the technical review, to ensure the software does what the documentation says it does, is also basically the same regardless.

See **TECHNICAL** page 26

*Robins is a senior product information analyst at the Burroughs Corp. in Radnor, Pa.*

## Computervision tools debut

### Source code documentation and consultation offered

By Rosemary Hamilton

**BEDFORD, Mass.** — Computervision Corp. has informed customers that it will introduce conversion tools to help automate the porting of its older computer-aided design and manufacturing systems to its recently introduced 32-bit workstation.

It will also offer source code documentation along with programming consultation for writing programs on the new system.

The Bedford firm's announcement last week to its users group, User Software Coalition, comes on the heels of the massive two-year conversion project in which Computervision ported its Cadds software from proprietary minicomputers to an industry standard workstation. The system, called Caddstation, was introduced in April. It is based on Sun Microsystems, Inc. hardware and runs under University of California at Berkeley's 4.2 Unix.

Although the company hasn't "sorted through the packaging" of these offerings, it expects to release them in the fourth quarter, according to James Price, director of third-party marketing.

Computervision's as-yet-unnamed conversion tool kit is an enhanced version of the tool kit it used for its own conversion project. The tools were developed by Massachusetts Computer Associates, Inc., an Applied Data Research, Inc. subsidiary based in Wakefield, Mass. The two companies signed a letter of intent last week enabling Computervision to remarket the tools.

Price said the tool kit will range in price from \$10,000 to \$50,000, depending on the amount of code a user wants to translate. He said the tool kit will be offered in four packages: for conversion of 10,000 lines of code, 30,000 lines of code, 100,000 lines of code or an unlimited amount.

The documentation and consultation will allow users to write programs for the new Cadds. With the older systems, Computervision provided portions of source

See **COMPUTERVISION** page 20

### INSIDE

Sterling Software's Dylakor Division announces a spreadsheet for mainframes/20

### NEW THIS WEEK

- TRT offers telex interfaces for IBM, DEC minis
- Apollo Computer releases the Domain/Performance analysis kit

■ For more on these and other new products, see pp. 91-102.

### INSTANT ANALYSIS

*"The spirit of the addendum process was to allow you to add new features to Cobol 85 without going through a 10 to 15 year cycle. But the implementation has not been clearly thought out."*

— Lawrence K. Madison, DP director, Travelers Insurance Co.

### SOFTWARE NOTES

## Cobol compiler certified by GSA

The first Cobol compiler to be certified as meeting the standards of ANSI's **Cobol 85** has been produced by **Micro Focus, Inc.** The Palo Alto, Calif., supplier of compilers and productivity tools, said that its compiler was validated "without errors."

A few Cobol 85 compilers that are not yet validated are already on the market, including one from **Tandem Computers, Inc.**, with more entries expected. Vendors must have compilers validated by the General Services Administration by Oct. 1, 1987, in order to bid on government contracts.

See **NOTES** page 23

## Cobol options aid productivity

By Eddy Goldberg

**SALEM, Mass.** — Language Technology, Inc. recently made available Release 4.1 of Recoder, a Cobol restructuring product with 26 new report and formatting options.

Release 4.1 is intended to boost programmer productivity by providing more flexibility and customization features. The Control Flow Report, for example, makes it possible to split unwieldy programs into more manageable units.

In addition, Recoder users may now specify the paragraph size and number of new paragraphs created in order to tailor the restructured program to their needs, said Eric Bush, chairman of Language

See **COBOL** page 26

## Brush Up on Mitrol's 4GL

...by attending a seminar on our fluent and fertile fourth generation language, MITROL. Call for dates and times

Atlanta  
Boston  
Chicago

Detroit/Toledo  
Hartford  
Los Angeles

New York City  
Saddlebrook, N.J.  
San Francisco

Toronto  
Washington, D.C.  
White Plains, N.Y.



**Mitrol.**  
**The Fine Art of Information Management.**

Mitrol Incorporated, World Headquarters, 800 West Cummings Park, Woburn, MA 01801 (617) 933-9545  
Mitrol Incorporated is a partnership with Teac Systems Inc. Teac Systems Inc. is headquartered in Holland 31345.71544





## SOFTWARE &amp; SERVICES

## Sterling unveils spreadsheet

GRANADA HILLS, Calif. — Sterling Software, Inc.'s Dylakor Division announced its first application product, a spreadsheet for mainframes.

Named Dyl-Calc, it was designed to mimic the operations of a personal computer spreadsheet but be available to many users at the same time and offer users the option of viewing several spreadsheets on the same screen.

Information from any mainframe data base can be loaded into the spreadsheets, and information from one may be edited and integrated into another, Dylakor President Carole Morton said.

The spreadsheet can also make use of mainframe security, as three-level

password protection can be invoked and individual cells containing constants can be protected, allowing alteration of variables only, Morton claimed.

Dyl-Calc is available now for \$6,000 to operate under DOS/CICS, OS/CICS and MVS/TSO.

In addition, Sterling announced Shrink/MVS, a data compression and encryption system able to provide 60% to 80% file compression for VSAM and non-data-base files under MVS.

The compression software was previously available for Cullinet Software, Inc. IDMS and IBM IMS, DOS and DOS/MLI systems, Sterling spokesmen said.

## Computervision turns believer after Compass helps convert software

By Rosemary Hamilton

WAKEFIELD, Mass. — When David Loveman, president of Massachusetts Computer Associates, Inc. (Compass), went to Computervision Corp. in 1984 to pitch his firm's software conversion tools, he found a willing listener.

Computervision, at that time, was still the leader in the computer-aided design and manufacturing (CAD/CAM) market and was preparing to convert its popular Cadds software — about six million lines of code — from its proprietary minicomputer platform to industry-standard hardware. The day after Loveman's pitch,

Compass and Computervision were negotiating a contract.

Computervision had evaluated a number of different vendors' conversion tools but settled on the Compass line for several reasons, according to Massood Zarrabian, a Computervision vice-president who served as project leader.

In part, it liked the geographical proximity of the Wakefield, Mass., firm. But more important, Zarrabian said, was the quick rapport between representatives of the two companies. "There was a lot of comfort. We hit it off at our first meeting," he said.

In addition, Compass had a track record of handling large-scale conversions, albeit smaller than the Computervision task.

On Sept. 4, 1984, Compass signed a contract with Computervision and began developing the conversion tools. Compass is a 25-year-old company that was acquired in the late 1960s by Applied Data Research, Inc.

The bulk of the Cadds software had been written in Fortran S, a Computervision version of Fortran, and a small portion of the software had been written in a proprietary language called TPL. Compass' assignment was to develop tools that would convert Fortran S to Fortran 77 and TPL to C.

Zarrabian said that without the Compass tools, "we probably would have needed 15% to 20% more people." At various times, the project involved up to 200 people. On average, 40 to 100 people worked on the project, he said.

The heart of the conversion tools is a data base that contains "global information" on the software, including such information as relationships among data, how file names are used and what routines call other routines, Loveman said.

The data base contains instructions for the tools that actually convert the software. During the conversion, the code must be rewritten in a new language while keeping the function intact. When translating a

See COMPASS page 22

# "Hey, Mr. Berland! We have your underware!"

A recent magazine article referred to Mr. Robert Berland, a Vice-President of IBM, who stressed today's need — not for software, hardware or firmware — but *underware*, to invisibly tie all functions together.

Well, Mr. Berland, we have your underware.

It's called PROTEO™ — a totally new genre of PC-based software that can transparently tie all mainframe and micro functions together, into one consistent, tailorable user environment. It is designed for the modern Information Center, by the same people who conceived and implemented the original Information Center.

**Try this new underware on for size before Sept. 1st — get a Watson board worth \$498.**

PROTEO is available now, at a price of \$40,000 U.S. for an unlimited-use corporate license that supports VM/CMS and IBM LAN communications. Or, you can try it without networking facilities on a single PC for just \$695 U.S. And if you decide later to move up to the corporate version, we'll give you full credit for that \$695 trial investment. Whatever you decide, the Watson Board is yours to keep.

PROTEO runs on an IBM PC or compatible with minimum 640K and 10 Mb hard disk.

## PROTEO

SOFTWARE INC.

A subsidiary of  
Online People Inc. and  
Norelco Corporation of Minneapolis  
7100 Woodbine Ave., Suite 300,  
Willowdale, Ontario L3R 5J2  
(416) 479-2000

Watson, Lotus, Wordstar and IBM are reg'd trademarks of  
National Microsystems Corporation, Lotus Development  
Corporation, Micropro International Corporation, and  
International Business Machines Corporation. Proteo  
is a trademark of Proteo Software Inc.



### How can you lose?

PROTEO does all this — and more:

- Provides powerful development tools for PC-based applications.
- Software ROBOTS perform behind-the-scenes tasks such as backup, and mailbox or file cabinet monitoring — even after you've left for the night.
- Full capability for mailing, filing, retrieval and security of complex objects such as voice messages, Lotus spreadsheets, Wordstar documents, programs, etc.
- Transparent PC-to-LAN and PC-to-mainframe dialogue.

Try PROTEO before September 1st, and we'll send you a Watson Board, which incorporates a Voice Digitizer and a 1200 baud modem. (A \$498 value.)

Please forward the following version of PROTEO.

☐ Trial version \$695 U.S.

☐ Check or money order enclosed incl. applicable state or provincial taxes

**PROTEO Software Inc.**  
7100 Woodbine Ave., Suite 300  
Willowdale, Ont., Canada L3R 5J2

☐ Full version \$40M U.S.

☐ Enclosed is a purchase order incl. applicable state or provincial taxes. Please bill us.

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State/Prov. \_\_\_\_\_ Zip/P.C. \_\_\_\_\_

Name \_\_\_\_\_

☐ Please send additional information only

I understand that if I choose the trial version and subsequently upgrade, I will be credited with the cost of the trial version.



# MANTIS® 1981

**"Cincom application tool slashes development time."**

Source: Computerworld, January 19, 1981

# MANTIS 1982

**"MANTIS has paid for itself many times over in programmer productivity and end-user satisfaction."**

Source: Jay Lazzare, V.P. for MIS, Pellerin Milnor

# MANTIS 1983

**"Performs like COBOL, with the productivity of a true 4GL — and used for all new, on-line development."**

Source: Tony Liberoni, Manager of Operations and Systems, PPG Industries Chemical Group

# MANTIS 1984

**"100 % of our new on-line development is in MANTIS."**

Source: Luther Perry, D.P. Director, Santa Cruz County, CA

# MANTIS 1985

**"MANTIS is the international on-line application development standard for General Foods."**

Source: Fred Lambrou, International Director of Information Services, General Foods International

# MANTIS 1986

## The Best Just Got Better.

Proven in over 2,000 user sites, MANTIS, from Cincom®, is the premiere fourth generation application development system.

And, now the best is even better. Our major new release of MANTIS gives you even greater performance and productivity.

With MANTIS, you can prototype, refine, test, and release an application for production in a single, interactive session. Compile-free MANTIS applications are fast, and easy to develop and maintain. And MANTIS provides such high performance that many users make it their standard for all on-line applications.

MANTIS portability lets you move applications — **without change** — from one operating environment to another. From VSE to MVS. From CICS to IMS/DC. Even from one hardware system to another, including IBM®, DEC™ VAX™, Wang VS®, NCR® VRX and others. And MANTIS provides support for multiple data structures, such as VSAM, DL/I, SQL/DS, SUPRA™ and others.

To see just how much better MANTIS really is, **compare it to any other system** you're using or evaluating. For a demonstration or more information, call the toll-free number below. In Ohio, call 513-661-6000. In Canada, 416-279-4220.

**1-800-543-3010.**



World Headquarters • 2300 Montana Avenue • Cincinnati, Ohio 45211

IBM is a registered trademark of the International Business Machines Corporation.

DEC and VAX are trademarks of Digital Equipment Corporation.

Wang VS is a registered trademark of Wang Laboratories, Inc.

NCR is a registered trademark of NCR Corporation.

Now Available  
For IMS/DC Users.



## SOFTWARE &amp; SERVICES

## Compass aids conversion

From page 20

particular module of code, the conversion tools refer to the data base to see what the purpose of the module is, he said.

The conversion tools are made up of three main components. The front end reads the code and converts it to an

internal, symbolic form. Then the transformer makes the necessary changes to the symbolic representation. Finally, the unparser rewrites the internal form as the new code.

The tools were used primarily to convert the more routine portions of Cadd that would have been monotonous work for a programmer.

Other portions of the code that were more complex had to be converted manually.

"Things that were hardware specific, like graphics-related things, couldn't be converted automatically because they had to be re-engineered," Loveman said.

In the spring of 1985, it became clear that Computervision was losing market share to competitors IBM and Intergraph Corp. "By March 1985, the conversion project went into panic mode," Loveman said.

In March, Compass delivered tools to be alpha-tested

at Computervision; it followed up with a revised tool set in June for beta testing. At that point, the "serious conversion" began, Loveman said. Computervision stayed on schedule, converting code and then sending it out to customer sites for testing in late 1985 and early this year.

In April, with the conversion process completed, the company introduced its Caddstation CAD/CAM 32-bit workstation, as it had planned.

## DBMS bows, converts workstations

By Eddy Goldberg

BERKELEY, Calif. — Sybase, Inc. recently announced a software-based relational database management system that it says will convert a general-purpose 32-bit workstation into a high-performance database server.

Sybase will begin beta-testing the product at 10 sites next month, with general availability set for October on the Sun-3 workstation running University of California at Berkeley's Unix 4.2. The company plans to beta-test a Sybase version for the Digital Equipment Corp. VAX environment in October, with availability set for near year's end, spokesmen said.

The product consists of the Dataserver, which converts a 32-bit workstation into a database server, and the Data Workbench, a separate front end. The Data Workbench is an icon-based user interface that consists of an extended version of SQL, a report writer and application development tools.

TRW, Inc., an investor in Sybase, will host three beta-test sites. "It's much faster than the competing database management systems, is extremely user friendly and is evolving into something that will meet the data security needs of government contractors," said Stan Stahl, senior software engineer for TRW's Defense Systems Group.

Robert S. Epstein, executive vice-president of Sybase, offered two examples of the product's performance on the Sun-3. In a query that asked to fetch one row out of a million-row table using SQL, response time was 50 msec. In a 10-table join with 10 million-row tables, response time was 360 msec., he said.

Prices for the Dataserver and Data Workbench vary depending on CPU size. The Dataserver for the Sun-3 and Microvax II is \$18,000, and the Data Workbench is \$7,500. For the VAX 11/780, the Data Server costs \$40,000, and the Workbench, \$15,000.

## SCIENCE/SCOPE®

A U.S. spacecraft orbiting Venus made the first close-up views of Halley's Comet, giving scientists valuable insights into the comet at a time when it was on the far side of the sun and direct observations from Earth were impossible. NASA's Pioneer Venus Orbiter, built by Hughes Aircraft Company and circling Venus since 1978, conducted its investigation a month before five other spacecraft flew by the comet. The Orbiter was delicately repositioned with precise commands from Earth to observe Halley's at its closest point to the sun, a distance of about 55 million miles. The spacecraft measured changes in the comet caused by intense solar heating. It also provided an ultraviolet image of Halley's and its large surrounding hydrogen cloud. Data gathered by the Orbiter helped scientists determine the gas composition of the comet, the rate at which water vaporized, and the ratio of gas to dust in the comet.

A new-generation mapping radar has two advanced features to help it spot military targets and create maps with resolution equal to that of infrared sensors. The Advanced Synthetic Aperture Radar System (ASARS-2), designed to complement electro-optic sensors, is flown on a U.S. Air Force TR-1 reconnaissance aircraft and provides real-time radar imagery to a ground station in all weather. ASARS-2 has a "squintable" antenna, which allows it to look around obstructions to make maps and classifications of targets on a single pass. The system also has a spotlight mode, which allows the antenna to look back or forward to focus on a suspected target and glean more detail. Hughes is producing the system for the Air Force under a development and production contract.

The AMRAAM missile may become the next-generation weapon for protecting U.S. Navy surface ships against threats that have slipped through the outer defense shields. Sea AMRAAM, under study for ship self-defense, would be essentially the same as the Advanced Medium-Range Air-to-Air Missile in full-scale development by Hughes for the U.S. Air Force and Navy. However, compared with existing missiles, Sea AMRAAM would increase a ship's firepower because the missile's guidance system is much less dependent on the ship's radars. Many missiles could be fired at different targets simultaneously, and they could home in even if the targets were outside the field of the ship's radar systems. Sea AMRAAM is also faster, more maneuverable, and can fly farther than current ship self-defense systems.

Acting as a kind of design and manufacturing prompter, a new artificial intelligence network increases productivity by automatically generating instructions for assembling complex electro-optical devices. The Hughes Integrated Classification System (HICLASS™) analyzes product design information to determine the best assembly techniques. It then selects the most efficient manufacturing processes available. Operators, on demand, are able to call up appropriate graphical and text instructions in color as they interact step by step with the system. As a result, workmanship improves substantially and products are made better.

Hughes needs engineers, scientists, and programmers to forge new frontiers in aerospace radars, weapon control systems and avionics, airborne displays, aerovehicle data links, and airborne countermeasures. Current openings are for people experienced in design, development, test and manufacture for systems engineering, project/program management, design of circuits and mechanisms, and bringing these to reality through the application of advanced manufacturing techniques. Send your resume to Hughes Radar Systems Group, Engineering Employment, Dept. S3, P.O. Box 92426, Los Angeles, CA 90009. Equal opportunity employer. U.S. citizenship required.

For more information write to: P.O. Box 45088, Los Angeles, CA 90045-0088

© 1986 Hughes Aircraft Company

**HUGHES**

Subsidiary of GM Hughes Electronics

## Series/1

- Custom Software & Systems
- RPS Simulations
- All types of communications applications Async • SNA • LU 6.2 • CM
- In-house Series 1 development laboratory
- Client Nationwide
- Resumes always welcome
- Applied Management, Inc.
- 1350 Piccard Drive, Suite 210
- Rockville, Maryland 20850
- 301-670-4220



## SOFTWARE &amp; SERVICES

## Notes: Sterling supports DB2

From page 19

Sterling Software, Inc. has climbed aboard the DB2 bandwagon. It has announced its DMS/OS data storage management system for MVS will support IBM's relational data base management system. Support includes archive, backup and restore processing of DB2 data sets. DMS/OS currently supports IMS files, and with the DB2 announcement will also support archive/restore processing of VSAM files, Sterling officials said.

Applied Data Research, Inc.'s Dacrom/DB DBMS will be used with Pallm, Inc.'s software to provide relational capabilities for mainframe applications in the insurance industry. Pallm, based in Indianapolis, uses the DBMS in connection with its Pallmvector and Pallmpac systems, used in the life and property/casualty insurance business.

On-Line Software International, Inc. of Ft. Lee, N.J., is the first mainframe vendor to provide site licenses for its micro-to-mainframe link, Free-Link. An annual fee of \$3,000 for DOS/VSE users and \$5,000 for MVS users entitles a site-license holder to unlimited copies of the micro piece of the link and a copy per CPU of the mainframe piece. President Jack Berdy says 700 copies of Free-Link's mainframe software have been given away as part of a promotional program since fall 1985. The firm sells the micro piece for \$495 per copy to non-site license holders.

The popular statistical analysis package SPSS/PC Plus is also available on a site license basis, said John Grillos, president of SPSS, Inc. A university may license up to 2,000 copies of the \$795 package for \$2.50 each or \$5,000 for a first-year fee. Business users face the stiffer fee of \$6,000 for 100 copies or \$60 a copy.

The expert system building software Automated Reasoning Tool is finding employment in a variety of places as interest in commercial systems grows. The Inference Corp. product was recently adopted by Lotus Development Corp. for use in its development of products that incorporate expert systems, and Sun Microsystems, Inc. will offer it on its 32-bit Sun-3 workstation.

Also in the artificial intelligence realm, Hewlett-Packard Co. is offering Knowledge Craft, from Carnegie Group, Inc., on the HP 9000 Model 320 workstation.

BBN Software Products Corp. of Cambridge, Mass., is reportedly developing manufacturing and factory automation software for introduction later this year. It is the developer of the RS/1 scientific data analysis package.

Nomad2, the fourth-generation language and data base management system from D&B Computing Services, Inc., has been adopted by Holland Systems Corp. for use in development of its Information Resource Management product line. For example, Holland will offer its Strategic

Systems Planning to customers with Nomad2 for developing business models.

Bentley College in Waltham, Mass., may be at the forefront of a trend. Its continuing education center is offering a six-month program for career changes into hot line software support and microcomputer software consulting.

Feat, Marwick, Mitchell & Co.'s Catalyst Group has entered into a licensing agreement with Joseph and Cogan Associates, Inc., a Burroughs Corp. subsidiary, to provide Burroughs users with Catalyst's Pathvu and Structured Retrofit. Pathvu measures program logic against structure programming principles, while Structured Retrofit rewrites Cobol into structure programs.

## Computer Associates unwraps data security tool for MVS, MVS/XA

By Charles Babcock

NEW YORK — Computer Associates International, Inc. announced a release of a data access security package it acquired in December.

CA-Top Secret, formerly the Top Secret product from CGA Software Products Group of Holmdel, N.J., is now available in Release 4.1 for IBM's MVS and MVS/XA operating systems.

In addition to protecting data from accidental or intentional destruction, modification or disclosure, CA-Top Secret is now compatible with recent releases of IBM data base and interactive environments, including CICS

1.7 and IMS 2.1.

The release contains security enhancements in the areas of integrated storage control and IMS/VS Multiple Systems Coupling feature, company officials said.

The transaction level protection in CICS, IMS and Cullinet Software, Inc.'s IDMS is improved with increased administrative and reporting flexibility, company spokesmen said.

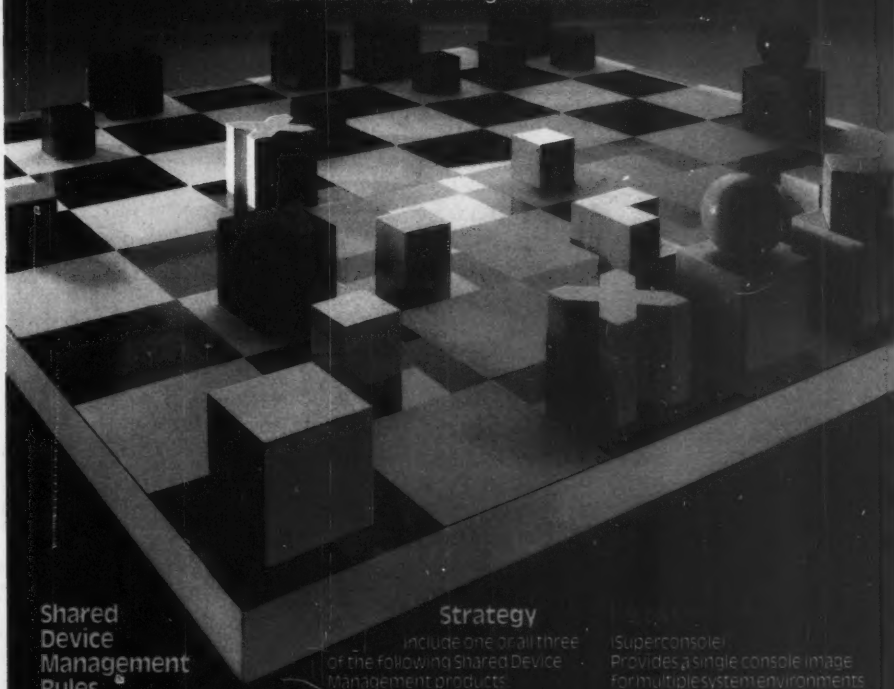
CA-Top Secret, first introduced in 1981, costs \$25,000 for a three-year license. CA-Top Secret reportedly requires no initial program loads, exits, macro coding or modification to the operating system for installation.

## MULTIPLE CPU SHOPS...

## Win the Shared Device Management Game and Gain a More Productive Environment

## Objective

To effectively manage the sharing of tape drives, DASD and consoles for a more productive MVS and MVS/XA operating environment.



## Shared Device Management Rules

Pick a company with proven stability, excellent worldwide support and timely product upgrades and enhancements.

## Strategy

Include one or all three of the following Shared Device Management products:

Shared Tape Allocation Manager: Automatically controls the allocation of shared tape devices.

Shared Dataset Integrity Plus: Allows the sharing of datasets and the simultaneous access of the same data.

Superconsole: Provides a single console image for multiple system environments.

## To Win Contact:

Duquesne Systems  
Two Allegheny Center  
Pittsburgh, PA 15212  
(800) 323-2600  
In PA (412) 323-2600

"Duquesne Systems is committed to continue to develop and support shared CPU products and remain the leaders in multiple CPU software."



# Achieve Full Integration For Your Corporate PC... With The SAS System Under PC DOS.

## One Integrated Solution For All Your Company Needs.

Now, you can have an information system that offers solutions for all of your company's needs. Data management and retrieval. Statistical analyses. Report writing. Applications development. And

more. All in one product.

And you can use it in every department and for every application. Data entry. Business reports. Text processing. Statistical summaries. With the PC SAS® System, decision-making, record-keeping, and analysis are standard and simple.

## One Solution With Complete And Powerful Features.

The same high-quality software for mainframes and minicomputers is now available for PCs. And it offers features as rich as any mainframe system you've seen. A data manager. A full-screen text editor.



dBASE II and dBASE III are trademarks of Ashton-Tate. Lotus and 1-2-3 are trademarks of Lotus Development Corporation.



A windowing facility. Complete data manipulation and statistical procedures. A display manager (to edit, display and control output from your PC). An interactive programming facility. A front-end menuing system that you can customize. With the PC SAS System, you get the power of the mainframe and minicomputer SAS System. And more.

## One Solution For Your Micro-To-Mainframe Link.

Now, you can link your PC to your mainframe. With the same system at both ends of the link. You can download data to your PC. Or develop and test applications on your PC. The PC SAS System reads data from programs like dBASE II, dBASE III and LOTUS 1-2-3. You can enter data on your PC, submit your job to the mainframe, execute it, and view the results on your PC. Or you can download data from the mainframe, add and

revise, and send the new data to the mainframe for job execution or storage. Regardless of which system you use, the language, syntax and commands are identical.

## One Solution That Is Remarkably Friendly.

Now, one system offers special features like programmable "pop-up" windows that make "friendly" a term you can understand. Use these windows to program function keys. To create "help" messages. To check the variables in your data set. And these windows can handle practically any utility you need. In fact, the PC SAS System is so friendly anyone in your organization can use it.

## One Solution With Site Licensing And Full Support.

At last, you can have the information system for your PC you've always wanted. With the advantages of site licensing. You

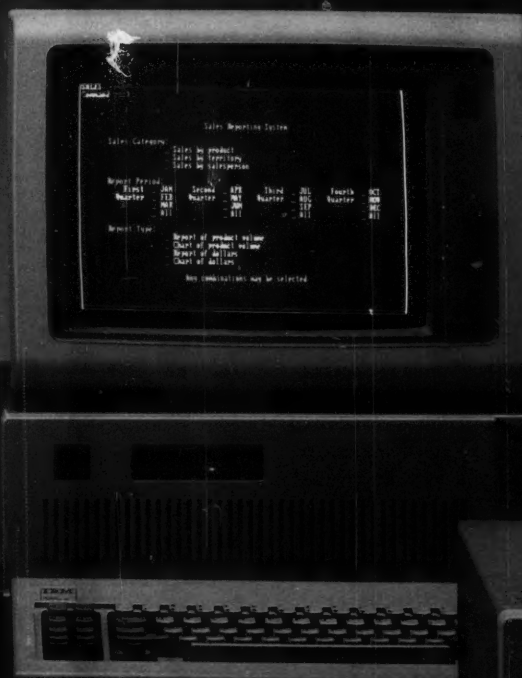
license the PC SAS System on an annual basis. You get all updates automatically. And at no additional cost.

The PC SAS System is also fully supported. Documentation accompanies delivery. Technical support is provided by phone or mail. Full customer training is offered. And it's all available from SAS Institute.

## The Solution For SAS Power On Your Corporate PC. Now.



SAS Institute Inc.  
Box 8000, SAS Circle  
Cary, North Carolina 27511-8000  
Telephone: (919) 467-8000, ext. 280  
Telex: 802505 SAS RAL





## SOFTWARE &amp; SERVICES

## Technical edit cause of delay

From page 19

less of the environment.

Why does the process invariably cause delays? In most companies, controls or written procedures for the process are nonexistent. Compliance with nonexistent controls, as one may expect, is casual at best. For example, the writer will request the corrected drafts be returned by a fixed date so the documentation can be completed according to a fixed schedule. Programmers, however, can usually be counted on to spend their time writing code or fixing bugs, especially at the end of a project. After all, they get paid for pro-

gramming, not for editing documentation. The review of the documentation usually gets put at the bottom of the programmer's priority list. Many weeks past the requested date, the writer will finally receive the corrected drafts.

When there are several reviewers of the same draft, as there usually are, the problem is compounded. Since the reviewers individually make corrections to a sentence, paragraph or page, it is inefficient for a writer to start incorporating corrections until all the corrected drafts are returned. In this way, the writer does not have to rewrite sections that have already been corrected. The writer usually must wait until the last draft is returned.

The most egregious cause for delay occurs when management has budgeted no time for the review of

documentation. Even though management knew up front that there would be several hundred pages of documentation, no time was allotted for reviewing the material.

The second most flagrant cause of delay occurs when management has budgeted the time for reviewing documentation, but uses the time for programming because the project is behind schedule. Both cases prove to be false economies because the project will be delayed by the time it takes to review the documents.

Even when the technical review process is planned and executed according to schedule, there still are problems that cause delays. Many technical editors lose sight of the purpose of the technical edit, wanting to discharge themselves of the task as quickly and easily as possible. The brevity of the results can be

laughable. These are my three favorite editorial comments:

- This is not correct.
- I don't think it works like this.
- This report has changed.

Ask any technical writer if these editorial comments are not commonplace in the industry. Other than being amusing, these edits needlessly cost the writer extra time. For example, examine the first comment. The writer now knows that something is incorrect and needs to research the answer. Usually, the writer has to track down the author of the comment to find out exactly why the documentation is incorrect and what the correction should be. This can be a time-consuming process, especially if there are several editors and each is equally vague. The point is, however, that this extra work can be avoided when the editors provide an explanation with their comments.

Editorial comment No. 2 is very revealing. The first interpretations are either that the editor is too lazy to test the code or the editor's code is too sloppy to provide a definitive answer. Another interpretation is that the draft was taken home to be edited (which is often the case) and the editor didn't have the opportunity to test the application. In either case, the burden of the work is shifted to the writer. The writer is going to have to take the time to find the answers that should have been provided by the technical expert in the first place.

The third comment is similar to the others. The writer has to scrounge up a copy of the new report when a copy could have been provided by the editor.

The technical review process is just one facet of a development project. Since it often comes at the end of the project, any delays it causes are felt immediately. Here are some recommendations to avoid delays:

- Establish a standard that can be used to budget time for technical edits; for example, 10 pages an hour. Realize that a six hundred page manual will take more than two days to edit properly.
- Incorporate the time needed to review documents in the project plan.
- Establish written procedures for deadline compliance to control the technical review process.

Every year, American businesses lose an estimated \$3 billion due to computer crime.\* And as personal computers and distributed processing gain momentum, the problem of protecting computer resources will become even more critical.

That's why it's essential that you protect your valuable—and vulnerable—information assets, with ACF2 Access Control Facility software for VSE.

• **Protection by default.** With ACF2/VSE software, you are automatically protected against unauthorized access to batch job execution, VSAM catalogs and files, disk files, tape files, VSE librarian utilities, system and private libraries, and CICS regions and transactions.

• **Complete audit reporting.** ACF2/VSE software records unauthorized access requests for reference by security administrators and auditors.

• **Phased implementation.** ACF2/VSE software lets you decide which resources to bring under security control. And when to phase them in.

• **Streamlined administration.** ACF2/VSE software allows an installation to handle security administration for several ACF2/VSE systems, other ACF2 systems or the ACF2/CICS subsystem from one system.

• **Ease of use.** ACF2/VSE software is the easiest full-scope security system to administer—both centrally, and in a decentralized mode.

• **Global security.** Only ACF2 software provides integrated and consistent protection across all major IBM operating systems including MVS, MVS/XA, VSI, VM and VSE.

ACF2/VSE software helps solve today's security problems today. And positions you to meet future security needs in the evolving IBM operating system environment.

To find out why more than 1,800 installations worldwide are already using ACF2 software, contact Shawn McLaren today, at 1333 Lawrence Expressway, Santa Clara, CA 95051-3595; (415) 941-4558; Telex 357437.

ACF2 is developed by SKK, Inc. Rosemont, Illinois. ACF2 is a registered trademark of SKK, Inc.

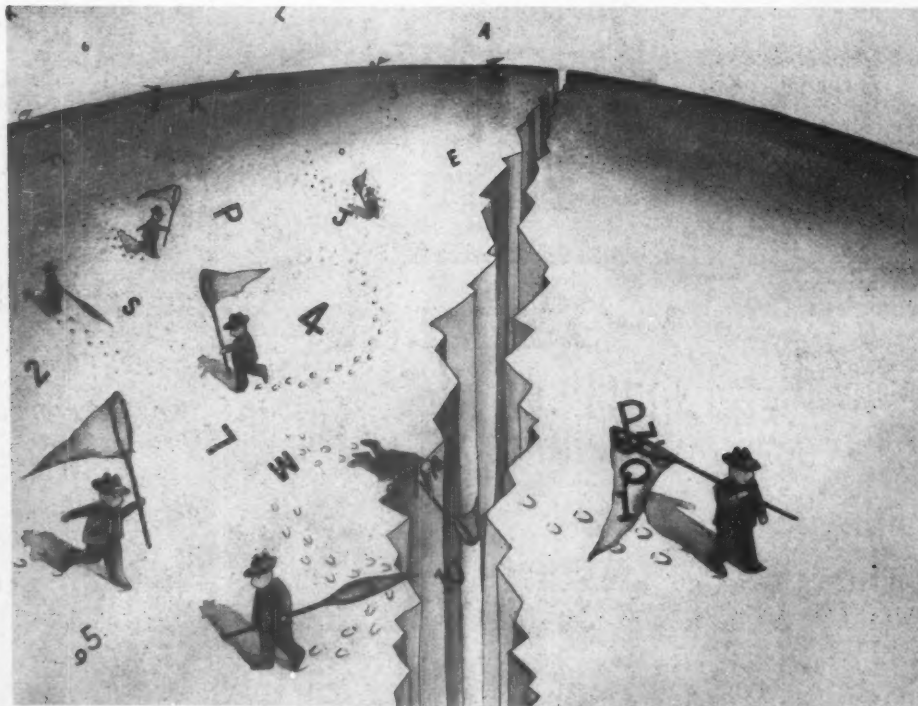
\*Data published by Computer Security Institute, 1985.

The Cambridge Systems Group

Over a decade of strategic software solutions.



## ACF2/VSE security software. Your bridge to the future.



## Cobol options aid productivity

From page 19

Technology.

Bush said the options enable programmers looking at a program for the first time to simplify complex expressions, making the program easier to understand. "Old programs have lots of conditionals added over the years, lots of 'ands,' 'ors' or 'nots,'" he said. One way the new options may be used is to eliminate one, some or all of the conditionals during restructuring.

The large number of parameters included in the release will allow users to tailor the restructuring operation to their needs by site, program or organization, according to Bush.

A \$150,000 perpetual license option replaces the three-year term previously offered at that price.



# MICROCOMPUTERS



**SMALL TALK**  
Will Zachmann

## Compatibles: Telecat scores

It is amazing that just a little more than a year ago, most Wall Street analysts were writing off vendors of IBM Personal Computer-compatible systems as sure victims of IBM's market clout. Early in 1985, the conventional view in the financial community was writing the obituaries of all the other vendors.

Of course, that wasn't how it happened at all.

Users, being typically less well paid than the Wall Street pooh-bahs and technically a lot smarter, had little difficulty recognizing a good deal when they saw one. Not only did the compatible vendors offer IBM PC-, XT- and AT-compatible systems that did everything the IBM-labeled product did, but many actually did it better. Compaq Computer Corp.'s Deskpro 286, for example, might not have been any cheaper than an IBM PC AT, but at least the disk drives could be counted on.

Perhaps most important of all, compatible vendors began to offer not only more features on quality products but sharply lower prices as well. Tandy Corp., recovering from its not-invented-here syndrome, began offering aggressively priced systems in 1985. Leading Edge Products, Inc. became both a price and a market leader at the low end, and Zenith Data Systems Corp. began taking big government contracts, largely by knocking the socks off IBM's pricing.

But for really aggressive prices, it was initially the then-unknown mail-

See **COMPATIBLES** page 31

*Zachmann is corporate vice-president for research at International Data Corp. in Framingham, Mass.*

## Board ups PC speed, aims to open door for Windows

By Peggy Watt  
and Douglas Barney

REDMOND, Wash. — Microsoft Corp. is paving more paths for its Windows graphical interface with the introduction last week of Mach 10, an add-on board that more than doubles the speed of IBM Personal Computers, PC XT's and compatibles, along with a new mouse and graphics input interface.

Mach 10 is aimed at quelling users' complaints that Intel Corp. 8088 microprocessor-based machines were not fast enough to run Windows effectively and required the faster processing speed of Intel 80286-based machines. "We think Mach 10 will allow corporations to move to Windows without having to upgrade their machines," said Michael S. Cooper, manager of Microsoft's hardware group.

The Mach 10 has a dual-speed mode and

can run at nearly 10 MHz or can switch to 4.77 MHz, the standard speed of 8088-based machines. The slower speed is necessary to accommodate the copy-protection schemes of some older versions of software packages. "We don't anticipate too many compatibility problems there," Cooper said. Mach 10 also supports an optional Intel 8087 math coprocessor.

The Mach 10 replaces the 8088 processor and runs on the IBM PC, PC XT and Portable PC, along with many compatibles, including the original Compaq Computer Corp. Portable, the Ericsson Information Systems, Inc. PC and the Leading Edge Products, Inc. Model D.

In related news, Microsoft earlier this month announced Inport, a device interface that is being promoted as a prospective standard for both hardware and soft-

See **BOARD** page 28

### NEW THIS WEEK

- Compuscan introduces PC-compatible page reader
- Mighty Computers offers 32-bit workstation
- For more on these and other new products, see pp. 91-102.

### INSTANT ANALYSIS

*"Philippe Kahn is selling software to himself. He is his typical customer, and that's how he's deciding what to market. But, so did Adam Osborne."*

— George Morrow, chairman of Morrow Designs, Inc., commenting on the sales techniques of Kahn's Borland International, Inc.

## Autodesk to rethink users group policy

### Exposition melee may force firm to OK dealer sponsors

By Rosemary Hamilton

Bowing to user pressure, Autodesk, Inc. recently said it will reconsider its policy of not acknowledging users groups with dealer affiliations. Autodesk's decision came after what one user characterized as a "brouhaha" at the international users group meeting held at the Autocad Exposition in Chicago late last month.

"We would welcome a change in their policy," said Robert Hartman, a member of the Hawaii Autocad User Group. "Dealers are a good asset to a user group. We have one excellent dealer in Hawaii that's a member, but he's prohibited by Autodesk from sponsoring or organizing the group."

See **AUTODESK** page 30

## Starbase takes laptop to office

By David Bright

NEW YORK — Last week at the PC Expo, Alloy Computer Products, Inc. introduced a storage subsystem for exchanging data between the IBM PC Convertible and desktop IBM Personal Computers. Alloy also unveiled Clusternet, an Intel Corp. 80286-based engine for multiuser personal computer clusters.

Framingham, Mass.-based Alloy Computer introduced the Starbase subsystem line with the belief that the PC Convertible is destined to see a great deal of use as a desktop system, not just as a portable computer.

"The PC Convertible's function is more than just carrying it with you on a trip," said Alloy President Dick Gorgens. "In order to use it effectively, you need some way of using it in the office. I like to think

See **STARBASE** page 28

## Oracle's SQL\*Calc makes a relational DBMS as easy as 1-2-3.

Oracle Corporation has developed a Lotus 1-2-3 compatible spreadsheet and integrated it with its ORACLE® relational database management system (DBMS). The new product, SQL\*Calc®, is the first to combine a mainframe-class relational DBMS with an easy-to-learn and familiar PC spreadsheet user interface.

SQL\*Calc is designed for 1-2-3 users who've run out of memory, flexibility and patience. SQL\*Calc allows you to put SQL database commands into spreadsheet cells... just like formulas. This permits you to access large amounts of data directly from your spreadsheet.

Like all Oracle Corporation products, SQL\*Calc runs identically on mainframes, minicomputers and PCs.

SQL\*Calc's foundation is the ORACLE relational DBMS, which pro-

vides users with a complete set of SQL commands through which they can create, retrieve, modify and otherwise control their data. SQL is the industry standard database command language for large computers. The SQL commands available in ORACLE are

identical to the SQL commands in IBM's premier mainframe relational DBMS products, SQL/DS and DB2.

Built on this powerful DBMS foundation is a Lotus 1-2-3 compatible spreadsheet that allows users to put SQL commands into spreadsheet cells in the same way as they enter formulas. When a SQL command for data retrieval is entered into a spreadsheet cell, information is automatically retrieved from the database and placed into the spreadsheet. SQL\*Calc also permits users to modify the database—and even create new database tables—directly from the spreadsheet.

SQL\*Calc is easy to learn because its menu and command structure are compatible with those of Lotus 1-2-3. And SQL\*Calc's ORACLE DBMS requires no supplement: It is vastly more powerful than the database components of 1-2-3, Symphony, Framework, dBase II, dBase III, or any other PC DBMS.

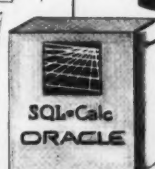
SQL\*Calc is available immediately for IBM PC/XTs and ATs for \$995.\* SQL\*Calc will soon be available on a wide variety of systems, including IBM mainframes, DEC, DG, and other superminis, and most UNIX systems.

For further information, or to order your copy of SQL\*Calc, call 1-800-345-DBMS. Or write Oracle Corporation, Dept. CS, 20 Davis Drive, Belmont, CA 94002.

# ORACLE®

Compatibility • Portability • Connectivity

\* Please inquire about our "Corporate 50" program for quantity licensing. Copyright © 1986 by Oracle Corporation. ORACLE® SQL\*Calc® Oracle, IBM, AT&T, Lotus and Ashton-Tate own numerous reg. trademarks. TRBA



**\$995**



## MICROCOMPUTERS

## Board speeds PC to run Windows

From page 27

ware developers seeking to integrate graphics input devices such as a mouse, Cooper said.

The mouse is also a handy, but not essential, part of Microsoft Windows, the graphical operating environment that is Microsoft's vision of the future for PC interfaces. Microsoft will bundle its bus mouse, the Inport interface, Windows and the Mach 10 board for \$549.

The Inport interface includes a new 40-pin custom integrated circuit and small, 9-pin connector. The board with the new chip will be marketed with the current Microsoft

Mouse replacing the logic circuits on the board.

The mouse chip supports not only the bus mouse but also digitizer pads, joy sticks and up to 50K bit/sec. two-way data transfer, Cooper said.

Microsoft will also continue to sell its serial mouse, which is more expensive because of its on-board intelligence, but which also enables a system with no free serial ports to use a mouse.

Though Microsoft is naturally regarded as a software company, sales of the Microsoft mouse have actually accounted for half of the firm's total product unit sales since its introduction three years ago, Cooper said.

"We're not in the hardware business per se, but with Windows and its graphical environment, we want to make sure there is a standard input for a graphical interface," he said.

Paradise Systems, Inc., Verticom, Inc. and Summagraphics Corp. announced they will support the interface in future products, and a Microsoft spokesman said several hardware vendors have indicated they will also support the interface.

In other news, Atari Corp. announced that it reached an agreement with Microsoft to market Microsoft Write for the Atari 520ST and 1040ST computers. Microsoft Write is based on the version of Microsoft Word written for Apple Computer, Inc.'s Macintosh personal computer.

Microsoft also announced Quickbasic, a Basic compiler, and a new C compiler. Both are easier to use and offer faster compilation speeds than previous products, said Robert Dickerson, group product marketing manager for Microsoft's language division.

## Starbase takes laptop to office

From page 27

that Starbase provides people with that ability."

According to Gorgens, the Starbase subsystem line, which starts in price at \$1,995, essentially allows the PC Convertible laptop computer to function as a desktop personal computer by exchanging data with desktops and by providing 20M bytes of hard disk storage.

While the PC Convertible contains a 3½-in. floppy disk drive, the desktop IBM PC uses the industry standard 5¼-in. floppy drive. Starbase includes a 5¼-in. floppy that functions as an additional drive for the PC Convertible.

Using standard IBM PC-DOS commands, users can reportedly copy files back and forth between the two drives. This conversion capability will be important for PC Convertible users who do not have a desktop PC, as will the increased storage capacity afforded by the 20M-byte hard disk drive, Gorgens said.

Available next month, the Starbase-II and Starbase-III are each packaged in a box connected to the PC Convertible's expansion port by a 36-in. cable. The \$1,995 Starbase-II includes a 5¼-in., 360K-byte floppy drive, a 20M-byte hard disk drive and a parallel printer port. The \$2,495 Starbase-III also includes a 40M-byte, ¼-in. cartridge tape drive for backups.

A repackaged version of Starbase-II, called Starbase-I, has no connecting cable and, hence, must fit underneath the PC Convertible. Scheduled to be produced offshore beginning in October, Starbase-I will cost \$1,495.

### Alloy targets Clusternet

Alloy is targeting its Clusternet multiuser engine at value-added resellers that want to provide high-performance network hardware inexpensively in a small footprint. Because Clusternet can host up to 16 users and several Clusternet units can be linked together, a Clusternet configuration can serve as a cost-effective multiuser alternative to Unix-based supermicrocomputers, Gorgens claimed.

Clusternet runs applications software designed for the IBM PC, Personal Computer XT and Novell, Inc. networks. Novell-compatible file and record locking capabilities are included. Gorgens added that Clusternet's 16-slot, 16-bit bus provides plenty of expansion room for vertical applications such as computer-aided design and manufacturing.

The electronics for Clusternet are all contained in a floor cabinet. Each user is allocated a board containing an 8-MHz Intel 8088-compatible NEC Information Systems, Inc. V20 processor and up to 1M byte of random-access memory (RAM).

A four-user unit, priced at \$14,995, includes the central 10-MHz Intel 80286 processor, 4M bytes of RAM, a 190M-byte hard disk drive, a floppy disk drive, a 120M-byte tape drive, two serial and two parallel ports and four terminals. The cost for each additional user is \$1,600.

Alloy, which analysts say is strongest in the tape backup business, last month filed for its first public offering.

**Our software  
lets your IBM mainframe  
exchange batch data  
with virtually any computer,  
at any time,  
completely  
unattended.**

**Sound incredible?  
It is.**

**SUPERTRACS™**  
**Incredibly flexible.**

**Call 800-824-8512**



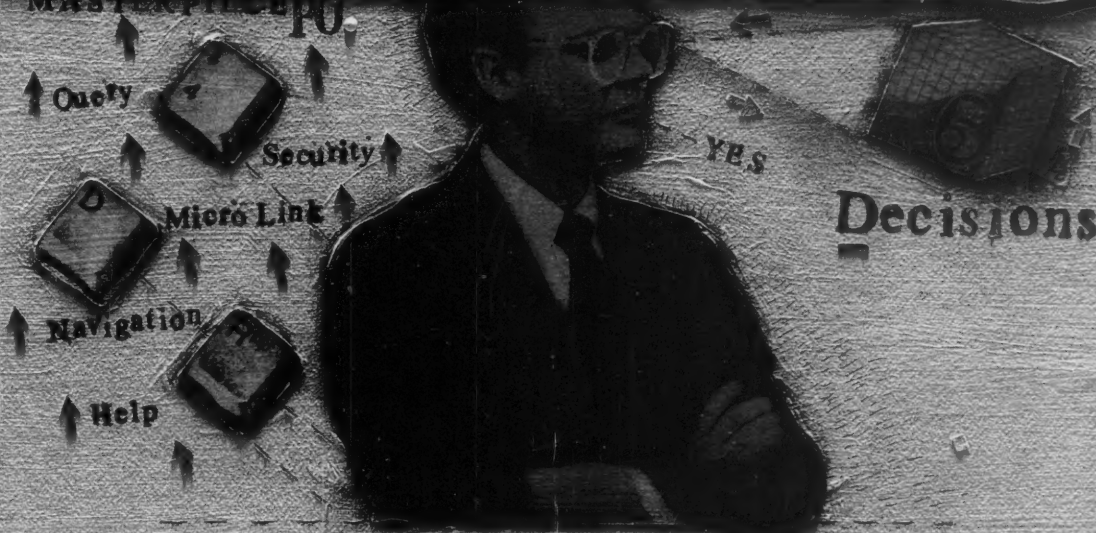
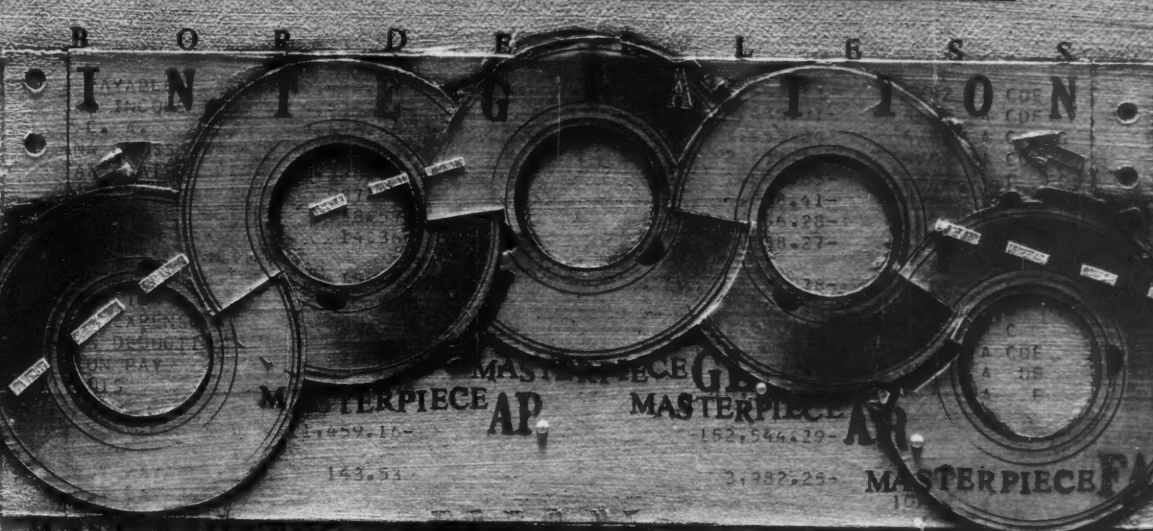
**STERLING  
SOFTWARE**

Systems Software Marketing Division  
11050 White Rock Road #100  
Rancho Cordova, CA 95670-6095

SUPERTRACS is a registered trademark of Software Laboratories, Inc.



**ONLY A MASTERPIECE OF FINANCIAL SOFTWARE CAN INTEGRATE THESE APPLICATIONS ON YOUR IBM MAINFRAME, DEC VAX OR IBM SYSTEM/38.**



Being able to immediately integrate all of your company's financial information is a tremendous advantage to sound corporate decision making.

To selectively consolidate corporate-wide reports. To combine data from accounts payable and accounts receivable with purchase orders, general ledger and fixed assets anytime, any day.

The Masterpiece Series does this for you.

It's the only complete portfolio of financial software with full integration features for your IBM mainframe, DEC VAX and IBM System/38—native to each environment. As such, it gives major corporations uniform financial reporting, even from multiple-machine environments.

You'll find Masterpiece to be faster, more powerful and more intelligently designed than any other financial software.

Faster, because information access is enhanced by "borderless" integrated applications. All applications share the same familiar English-like commands and screen prompts, so they're easy to learn and quick to use.

More powerful, because Masterpiece includes a unique query and reporting system that gives even the occasional user a comprehensive tool to instantly

retrieve information in virtually any report format. Yet, MasterSecurity provides an advanced safeguard against unauthorized access.

And more intelligent, because its efficient, modular design lowers DP/MIS maintenance and raises user productivity while expanding your future options.

Call or write for a copy of our 40-page brochure on how to integrate all of your financial information while gaining the security of doing business with General Electric's Software International—providing support for thousands of IBM mainframe, DEC VAX and IBM System/38 users from 30 offices worldwide.

**1-800-343-4133** (In Massachusetts 1-800-322-0491)  
One Tech Drive, Andover, MA 01810-2497

Masterpiece and MasterSecurity are trademarks of Software International Corporation. IBM is a registered trademark of International Business Machines Corporation. DEC and VAX are registered trademarks of Digital Equipment Corporation.



**SOFTWARE  
INTERNATIONAL**

*masterpiece*



## MICROCOMPUTERS

## Autodesk to rethink policy

From page 27

Autodesk is the maker of highly acclaimed microcomputer-based computer-aided design and manufacturing software. Since introducing Autocad in 1982, the company's installed base has swelled to approximately 50,000.

The company has maintained a policy of recognizing and supporting only those users groups formed and managed by users.

It has also said that dealers are welcome as group members, as long as they do not play an influential role in the group.

Early this month, a company spokeswoman said the policy, which has been evolving over the last few years, is under review.

"

*'I think the Autodesk attitude is self-serving. We're 56 Autocad users who aren't recognized by Autodesk.'*

— Robert Sprowls  
users group founder

Currently, those groups authorized by Autodesk are placed on a referral list for new users.

The vendor helps new user-organized groups get started by alerting registered users in the group's geographical area.

"I think the Autodesk attitude is self-serving. We're 56 Autocad users who aren't recognized by Autodesk," said Robert Sprowls to Autodesk officials attending the Chicago meeting, regarding the Pittsburgh-based group he founded with a dealer.

Sprowls' comments were supported by many attendees at the users group meeting, who claimed that they have the right to include whomever they want in their groups.

## Swell of opposition

As the Autodesk policy was reiterated at the meeting by Sandra Boulton, an Autodesk marketing manager, the swell of opposition rose.

Finally, company President John Walker, who had been quietly sitting in the back of the meeting room, said, "For God's sake, what does it matter if a dealer is in a user group? I would say of the annoying people I've met, only a small percentage have been dealers."

In a series of interviews following the users group meeting, Autocad users said they believe dealer participa-

tion in their group is helpful because dealers are often more knowledgeable of the software and also have access to product information before users.

However, Autodesk has said dealer-organized groups can give those dealers an unfair advantage over other dealers.

## Sales leads

As a users group contact person, a dealer is, in effect, receiving sales leads when

Autodesk refers new users to that group.

David Cohn, an architect with Thorn, Howe, Stratton & Strong, a design firm in Memphis, and a member of the Memphis Autocad User Group, said his group decided to hold meetings on neutral territory after an experience with a dealer that left "bad feelings all around."

According to Cohn, the Memphis group, which is authorized by Autodesk, originally held meetings at vari-

ous dealerships in that city.

At one meeting, a user presented the idea of the group buying peripheral equipment in bulk by mail order to save money.

"The dealer really took offense, as if we were advocating mail order over dealers. He told us we were not welcome in his store again," Cohn said.

His group does not have any dealers on its board, but Cohn said dealer participation is essential and his

group has many dealers as members.

Sprowls' Pittsburgh group is not authorized by the vendor because a local dealer is a cofounder and serves as technical director of the group. In addition, meetings are held at this dealer's site.

"I think it is up to the users how to run the group," Sprowls said. "We want to be recognized and be on their list. We can't get Autodesk people to speak at our group."



## Only AST Spells Out All T

In the game of PC-to-System 34/36/38 communications, AST gives you all the pieces to make the winning twinax connections.

Our new, innovative local cluster and async dialup packages build on the strengths of our best selling AST-5251/11 Plus solution. The results are cost-effective, local and remote IBM® 5251 Model 11 emulation.

**AST-5250/Local Cluster.** This complete hardware/software solution allows five PCs to access and share information with your IBM minicomputer through a single twinax connection. It's

simple...up to four clustered PCs are connected via RS232 cable or async modems to a master PC, which is in turn connected to your minicomputer with twinax cable.

**AST-5250/Async Dialup.** An option now available for our AST-5251/11 and 5251/11 Plus customers, this advanced software package provides remote communications for a single PC to a host minicomputer. This is accomplished through an async link to the AST-5251/11 or AST-5251/11 Plus equipped PC that is connected with twinax cable to a System 34/36/38.

AST-5250/Local Cluster

AST-5250/  
Async Dialup  
featuring multiple  
sessions



## MICROCOMPUTERS

## Compatibles: Telecat scores

From page 27

order brands like PC's Limited that pioneered low price points. True, they quoted bare-bones system prices without hard disks, monitors and, often, key adapter cards. But they still began driving home to users the evident fact that only bozos

would pay IBM's list prices for personal computers.

Even 18 months ago buying a Compaq system was considered risky by many corporate buyers, but things are radically different today. Only the most die-hard believers among the Big Blue faithful are still willing to shuck out up to twice as much as necessary to often get not quite as much.

Buying less-expensive compatibles, adventuresome in early 1985, became ac-

ceptable late in that year and is getting downright fashionable today.

My personal computer hardware pick for July is an exciting new IBM PC AT-compatible entry: the Televideo Systems, Inc. Telecat 286. Not only is it from a vendor whose name is familiar to many larger users because of its terminal line, but the machine is priced quite aggressively.

Listing for \$2,995 with a 20M-byte hard disk and

\$3,495 with a 30M-byte disk, the Telecat 286 offers an AT-compatible system for about the price of a PC XT.

These prices, although low compared with IBM or Compaq, may not seem all that aggressive compared with those of the mail-order vendors who now list AT-compatible systems as low as \$1,495. The mail-order vendors quoting these prices, however, are listing a configuration without a hard disk, display adapter or monitor.

The Telecat 286 configurations include the hard disk, a Televideo monochrome monitor with a 640-by-400-pixel high-resolution graphics capability and a display adapter that supports standard IBM color and monochrome graphics, the high-resolution monochrome capabilities of the system monitor (including a 16-value gray-scale mode) and an extended 16-color mode for standard color monitors.

With these capabilities, the Telecat 286 at list price looks quite competitive even with the mail-order systems from lesser known brand names, which are priced only slightly lower for comparable configurations.

Unfortunately, the extended graphics modes are compatible with neither IBM Enhanced Graphics Adapter (for color) nor Hercules Computer Technology, Inc. (for monochrome). This rather limits their utility since they are unlikely to be supported by most software vendors.

However, users with special applications willing to write their own software may find the enhanced graphics modes a plus.

For the rest of us, the Telecat 286's standard display card's compatibility with the IBM monochrome and GCA Corp. adapters will be sufficient.

### Comfortable keyboard

The keyboard is comfortable and is laid out like the original AT keyboard but with LED indicator lights on the Caps Lock, Num Lock, and Scroll Lock keys.

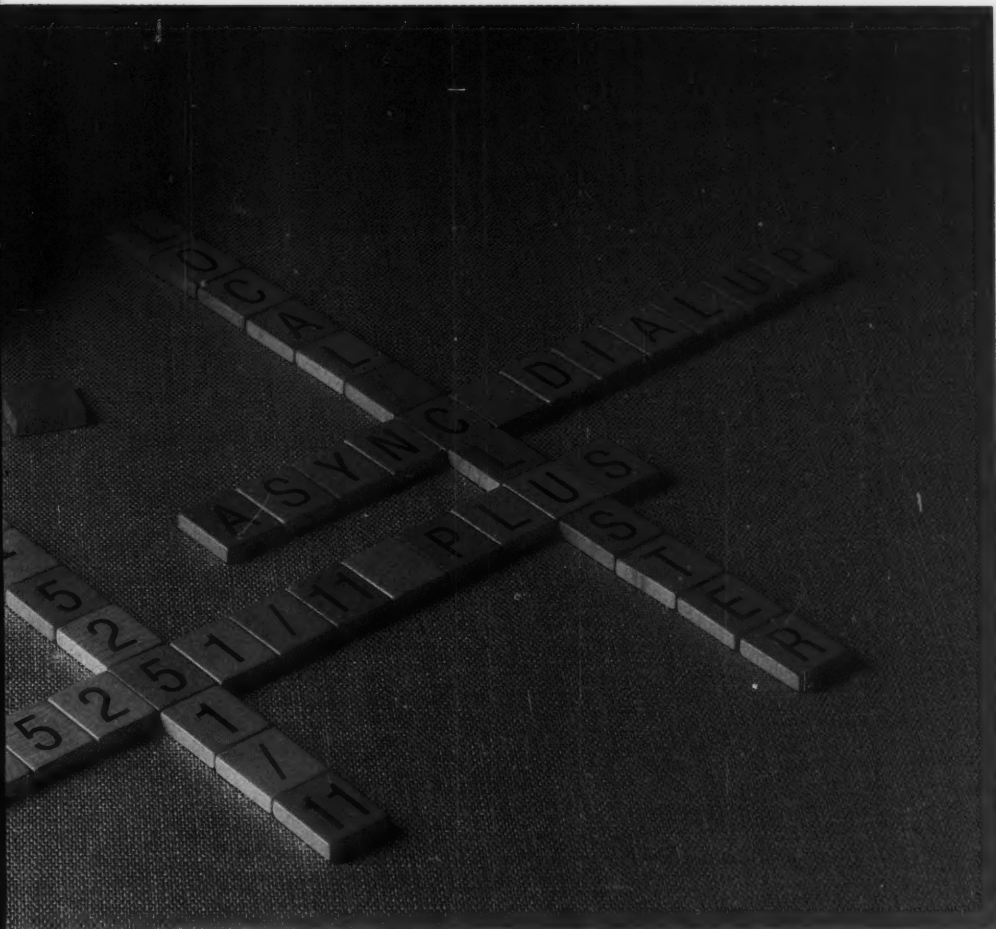
Not surprisingly, given Televideo's long experience in the terminals business, the display is comfortable, easy to read and quite impressive when the high-resolution monochrome capabilities are utilized.

Documentation is solid, although sometimes less clear than a beginner would like, especially as far as system setup goes.

The Telecat 286 achieves a relatively small footprint (compared with the PC AT) partly by mounting the system board in a removable tray at the bottom of the system. This, while an advantage should the system board need replacement, is rather an inconvenience in ordinary use.

All things considered, however, the Telecat 286 definitely gets my recommendation as an alternative to the IBM PC AT worthy of serious consideration by corporate users.

It is not only much less expensive and supported by a well-known vendor, but like many other compatibles capable of running at 8 MHz, it easily outperforms the standard AT as well. I suspect we will be seeing quite a few of them on the desks of corporate America.



## he 5250 Twinax Solutions.

AST-5251/11  
Plus  
featuring  
multiple  
sessions

**AST-5251/11 Plus™** The best selling 5251-11 emulation board is now even better...with options like AST-5250/Async Dialup and the AST-5250/Local Cluster Upgrade. It's the industry standard for local twinax connection to IBM's complete minicomputer family.

**Win The Game.** Get all your pieces from AST and score in the PC-to-System 34/36/38 game. For more information call our Product Information Center (714) 863-1480. Or send the attached coupon to AST Research, Inc., 2121 Alton Avenue, Irvine, California 92714-4992.

**AST**  
RESEARCH INC.

Yes, I want to learn more about AST's PC-to-System 34/36/38 communications solutions.

Name

Title

Company

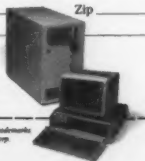
Address

City  State  Zip

Phone (  )

Number of PCs to be connected to System 34/36/38

Send to: AST Research, Inc., 2121 Alton Ave., Irvine, CA 92714-4992



AST-5251/11, AST-5251/11 Plus, AST-5250/Local Cluster and AST-5250/Async Dialup trademarks of AST Research, Inc. IBM registered trademark of International Business Machines Corp. Copyright © AST Research, Inc., 1986. All rights reserved.





## EVEN IN OUR EARLIEST DAYS, OUR EMPLOYEES EXHIBITED LEADERSHIP.

Four score and seven years from now, will the company that sold you your business software be around to fix a problem?

Promises don't count. You have to look at a company's actual history.

At McCormack & Dodge, we're in the unique position of having two histories, both distinguished, to submit for your consideration.

One is our own, dating back to the 1960's,

when we began as a one-package software house in the Boston area. Through leadership technology, we grew to be a global company, serving the world's greatest corporations with a broad multi-package software line.

The second history belongs to our parent, Dun & Bradstreet. It dates back to pre-Civil War days, when one Mr. Lincoln worked as a D&B credit correspondent.

No American company has a better history of stability than Dun & Bradstreet.

Put this proven stability together with the proven technology of McCormack & Dodge, and you have something unique in the software industry.

A supplier whose strength eases your mind when you worry about the years ahead. Even if it's four score and seven of them.

### McCormack & Dodge

**DB** a company of  
The Dun & Bradstreet Corporation

McCormack & Dodge Corporation, 1225 Worcester Road, Natick, MA 01760, 1-800-343-0325



# COMMUNICATIONS



**DATA STREAM**  
Walter Ulrich

## Networks for crisis coping

Many companies' communications facilities are inadequately equipped to handle the sudden increase in demand that often happens during a crisis. A business crisis, such as unwelcome attention from T. Boone Pickens, greatly increases the level of executive communication. A physical disaster, such as a flood or fire, can destroy vital records and interrupt operations to the point where a company is forced to go out of business.

Corporate communications networks are designed to support business activity at its normal rate. Insufficient communications setups can frustrate the company's attempts to deal with a crisis. No computer or communications manager wants his department to add to the chaos instead of improving the situation.

In today's on-line environment, restoring processing power and peripherals alone is not enough. Communications facilities must be restored in the computer room and the user community.

In the same way the MIS director prepares a disaster recovery plan, the communications manager must prepare a crisis control program that will enable him to respond effectively to crises. This program has three essential elements:

**Introduce new communications technologies.** They will then be available in an emergency. Once these technologies have been installed, a plan

See **NETWORKS** page 37

*Ulrich is president of Houston-based management and technology consulting firm Walter Ulrich Consulting.*

## Broadband networks unite

### Ethernet-MAP coexistence offered by Bridge, Chipcom

By Elisabeth Horwitt

Products recently unveiled by Bridge Communications, Inc. and Chipcom Corp. enable an Ethernet local-area network (LAN) to be implemented concurrently with other LANs on broadband cable, company spokesmen claimed.

The offerings will be attractive to medium and large companies — "people who have recognized that one network solution will not fit all their needs," said Harvey Freeman, vice-president of Minneapolis network consulting company Architecture Technology Corp. "I look for broadband to become the favored medium to tie everything together."

The Ethermodem Remodulator from

Chipcom eliminates signal interference problems that sometimes occur when users implement a 10M bit/sec. Ethernet system, such as Chipcom's own Ethermodem, on a broadband cable that already supports other networks, Chipcom President Daniel Presser said.

Many of Chipcom's customers initially installed broadband to support a video surveillance system, a Sytek, Inc. terminal-to-host network or a factory network conforming to the Manufacturing Automation Protocol (MAP), he added.

MAP, from General Motors Corp., defines a token bus network that "takes up three channels, which are prime real estate on the broadband cable," Presser said. Chipcom's 8023HE Ethermodem Remodulator enables MAP and 10M bit/sec. Ethernet to coexist in adjacent channels without generating interference, he added.

See **BROADBAND** page 38

### Software vendors see light in Sun system

### Recent offerings facilitate multivendor file exchange

By Rosemary Hamilton

Two communications software vendors recently jumped on the bandwagon of Sun Microsystems, Inc.'s Network File System (NFS), which, until now, has been licensed primarily by hardware vendors.

NFS software allows users on multivendor systems to exchange files transparently across a local-area network.

Multiplex/NFS, recently released software from Network Innovations Corp. of Cupertino, Calif., allows IBM Personal Computer users to pull data from Unix data bases on a Sun host and incorporate it into files generated by popular PC software such as Lotus Development Corp.'s 1-2-3.

Residing on a Sun Microsystems host, Multiplex/NFS works in conjunction with

See **VENDORS** page 39

## Vitalink speeds up LAN bridge

By Stanley Gibson

MOUNTAIN VIEW, Calif. — Vitalink Communications Corp. recently announced Translan III, a bridge product that enables users to connect two Ethernet local-area networks (LANs) over terrestrial or satellite-based lines at rates of up to 2M bit/sec. Like Vitalink's earlier Translan II, Translan III operates at the data-link layer of the seven-layer International Standards Organization (ISO) model, enabling it to support a range of higher-level ISO protocols such as Decnet, Transmission Control Protocol/Internet Protocol (TCP/IP) and XNS.

"We're trying to take the geography out of the context of local-area networks," said Vitalink spokesman Paul Schaller. Translan III enables users on one Ethernet or IEEE 802.3-compatible LAN to communicate with users on a remote LAN as if all were located on the same local-area network, he explained.

See **FASTER** page 39

### NEW THIS WEEK

- Votan offers voice mail system with recognition capability

■ For more on this and other new products, see pp. 91-102.

### INSTANT ANALYSIS

"Centrex users are currently wondering how long they can put their telecommunications facilities in limbo. Telephone companies are offering a Band-Aid solution to their networking needs in the form of analog Centrex enhancements, and they don't know what the future holds in terms of digital services."

— John Powers, vice-president, strategic services, Telecom Management Corp.

# SYSTEM 2000® DBMS for Only \$12,000

All the Extras Without the Extra Costs

You don't have to spend a bundle to get a full-function data base management system. For a first-year fee of \$12,000, SYSTEM 2000® DBMS gives you:

- an integrated data dictionary
- on-line query/update
- a report generator
- relational data base access
- programming language interfaces
- high-quality training and technical support.

Renewal rates are even lower. Plus, you can now link SYSTEM 2000 DBMS with the SAS® System of software to build data bases, store and retrieve data, merge and manipulate data, perform your analyses, and produce reports and presentation graphics. You can even give Information Center users access to your DBMS through easy-to-use SAS menus.

Before you invest a bundle, find out why SYSTEM 2000 DBMS is the most economical data base management system in the industry.

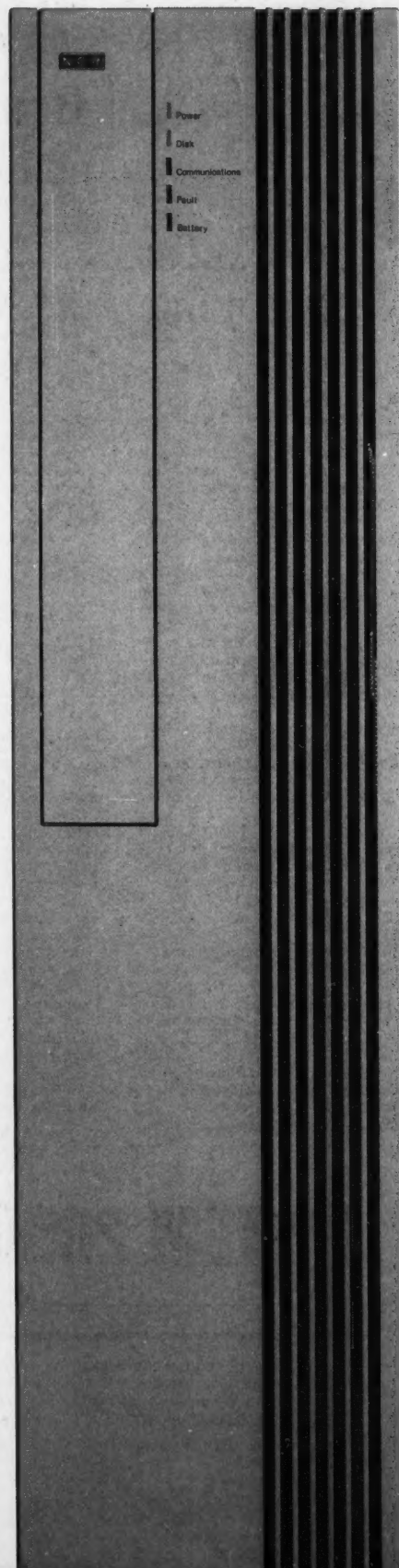
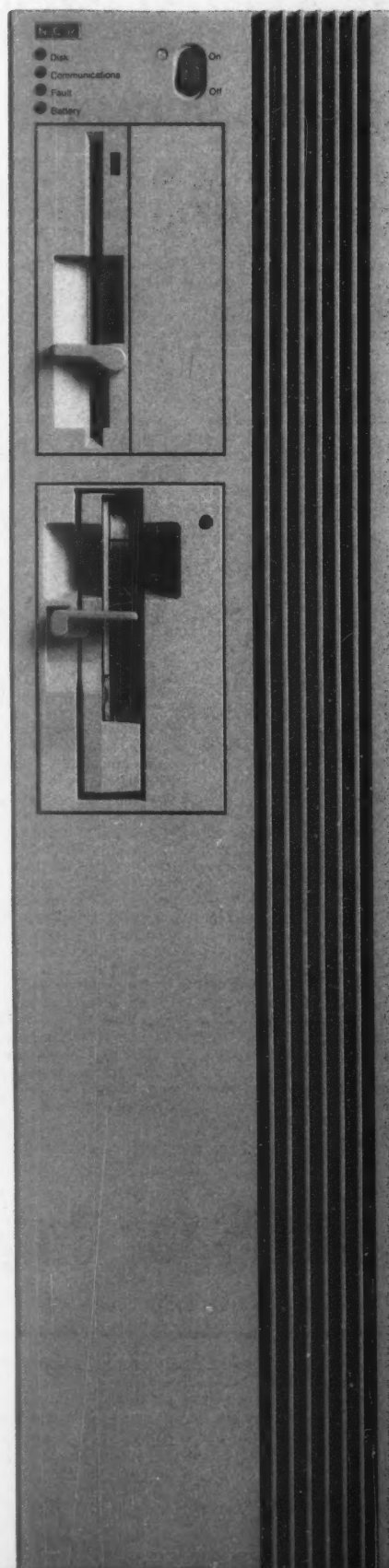
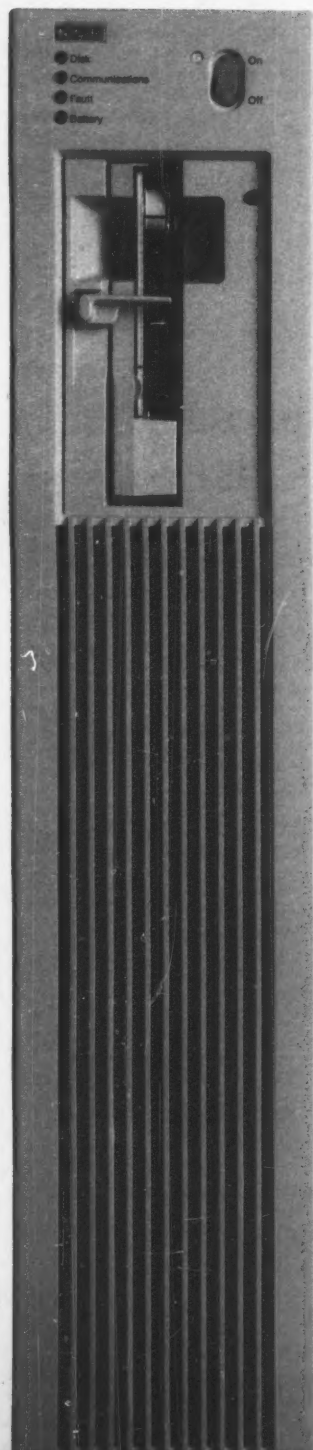
SAS and SYSTEM 2000 are registered trademarks of SAS Institute Inc., Cary, NC, USA.

Copyright © 1986 by SAS Institute Inc. Printed in the USA.



SAS Institute Inc.  
Box 8000, SAS Circle  
Cary, NC 27511-8000  
(919) 467-8000 Telex 802505







# TOWER<sup>3</sup>

Tower\* to the third power: MiniTower (1-8 users), Tower XP (1-16 users), and the new Tower 32 (1-32 users). Everything you've always loved about a Tower, in a size to fit any customer need.

NCR packs every Tower with all the features that have made us a power in the OEM market: a UNIX\* operating system that virtually never PANICs, extensive remote and in-service diagnostics, consistent error logging, power failure recovery, and much more.

And now, with the addition of the new Tower 32, you can offer your customers performance two to three times that of even the Tower XP. Memory capacity up to 16MB, with an amazing 14MB per program. SCSI (Small Computer Systems Interface) for large disk unit capacity. And connectivity for up to 32 users.

Compatibility between Towers means that as your customers grow, so can their Tower investment. MiniTower to Tower XP to Tower 32. With a minimum of software and support investment.

And, maximum profitability.

Plus, when you put the Tower family to work for any of your customers, you're putting the power of a \$4 billion corporation to work for you.

NCR product quality is unparalleled. We spend over a quarter of a billion dollars a year on R&D. Our nit-picking reliability fanatics subject every Tower to an unprecedented barrage of reliability tests. We maintain a standing army of 7,000 service representatives in 400 field locations nationwide. And more.

All to be sure that every Tower you sell lives up to our reputation. And yours.

**THE TOWERS.  
BUILT FOR SYSTEMS BUILDERS  
BY NIT-PICKING FANATICS.**



OEM Systems Division, NCR Corporation, U.S. Data Processing Group, USG-1, Dayton, OH 45479. Nationwide (800) CALL NCR.

Tower is a registered trademark of NCR Corp. UNIX is a trademark of AT&T. Specs subject to change. © 1985 NCR Corporation



# LaserTEN

## A great deal. Easier.

No other laser printer makes the power of laser printing so affordable or as easy to use as the Qume LaserTEN. You get professional looking printing, crisp graphics, multiple type fonts with unprecedented ease of system interfacing, operation and maintenance.



Exact type look you want. Use up to 20 typefaces per page.

Simply sophisticated to make it simply reliable.

The LaserTEN gives you the most durable printing drum made, an advanced processor controller for faster operation, and extra strength parts throughout. It will run for months with virtually no service and a minimum of supplies. And to make buying or



For the Multi-user office or the single-user PC.

With its ability to print out 10 pages a minute of high-resolution (300 x 300 dpi), solid characters, and detailed graphics, the Qume LaserTEN can easily handle the production

and quality demands of your clustered workstations and local area networks. At the same time, its priced low enough to justify its dedication to a single workstation.

A new ease of interfacing.

If you're using any of today's popular computers or printers you'll discover that the Qume LaserTEN and LaserTEN PLUS with enhanced graphics emulate all of the most popular laser, daisywheel, and dot matrix printers with the ease you already have, and, making the match is as fast — and as easy — as snapping in a new interface module.

The LaserTEN also puts you into a new world of printing sophistication. ITT Qume offers over 100 type styles in fast-loading, snap-in cartridges. Every typeface can be styled for the

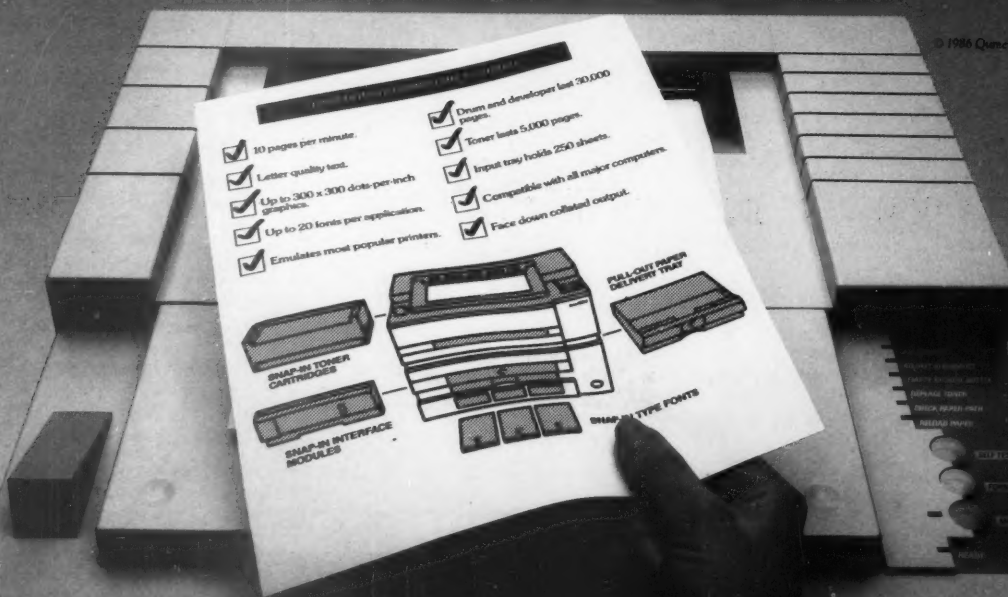


leasing easy there's ITT financing; and for your ongoing service needs, the ITT SERVICOM® Network.

Make a great deal easier. Call: ITT Qume, (800) 223-2479; TELEX 40970122; TWX 910-338-0232. Or, contact your nearest authorized ITT Qume dealer.

**ITT QUME**

© 1986 Qume Corporation





## COMMUNICATIONS

## Networks for crisis control

From page 33

should be prepared for using them effectively during a crisis.

### Speeding communications

Several existing communications technologies speed communications during an emergency. Paging systems make it possible to reach people quickly, even when they are away from both home and office. Mobile radio helps people communicate while traveling to crisis management meetings.

Electronic mail greatly enhances an executive's ability to obtain vital information, and voice mail enables managers on the road to call in for information using a Touch-Tone telephone.

Videoconferencing can bring people together over long distances on short notice.

Here is one case of how

”

**Several existing communications technologies — paging systems, mobile radio, electronic and voice mail, videoconferencing — speed communications during an emergency.**

the right communications technology helped out during a crisis. When the space shuttle *Challenger* exploded, millions of schoolchildren were watching, including students in the Houston Independent School District (HISD).

The HISD is one of the largest school districts in the country, with 233 schools covering 312 square miles and educating 193,000 pupils.

The shuttle disaster created an immediate need to deal with the children's anxiety. HISD school officials and psychologists went into a quick huddle and prepared detailed instructions for all the Houston school district principals.

Thanks to an innovative electronic mail system in place at HISD, those instructions were in the principals' hands two hours after the shuttle disaster occurred.

**Increase capacity of communications facilities.** Arrangements to secure communications services for peak periods must be made in advance. Network hardware must have the capacity to handle additional communications ports. Sources of

immediate supply for additional modems must be kept current.

Planning is simplified by the availability of on-demand network services available from value-added network suppliers, telephone companies and other carriers.

Subscriber agreements should be negotiated and plans made to bring services on-line during an emergency.

**Set up alternative facilities.** The configuration and

backup of the network control center is of primary importance, as alternate routing across the network can provide needed redundancy. Standby public network agreements add further flexibility. Contingency plans for communications setups must be prepared and put in writing.

### Revenue losses

A major U.S. company that is heavily dependent on voice communications sus-

tained heavy revenue losses a few years ago. The common-carrier-supplied main trunk to its headquarters ran across a stream on a vehicular bridge.

When the bridge was washed out, the company was out of business for a day. Alternate communications would have meant rapid recovery.

Backup facilities would have protected the revenue base for the company and maintained vital services for

its customers.

The communications crisis control program is the key to preparing for future problems. Preparations and expenditures must be made carefully and conservatively. Investments in equipment must be minimized.

The program is one more job for the already overburdened communications manager. It is also a critical priority — the company's survival may one day depend on it.



## Because he thought *any* V.22bis modem could be installed worldwide.



Not so. To be legally installed in most foreign countries, today's 2400bps dial modems must not only comply with the V.22bis recommendation, but must also meet *homologation* requirements of individual countries. And the truth is, many don't. So, before you sign a large purchase order, check the facts.

The fact is, there is only *one* company whose V.22bis modems are approved by over *forty* foreign countries: Concord Data Systems.

Our modems are also engineered for versatility . . . to fit *your* networks. We've got models equipped with CDS and "AT" command autodialing; MNP, X-PC and ARQ error correction. We've even put a 2400bps full-duplex dial modem and 3-port statistical multiplexer in one box! Our modems support today's most popular, full-duplex modulation

rates, including CCITT V.22bis, V.22, V.21, V.23, Bell 212A, and Bell 103. And we offer you stand-alones, card modems for nests, and IBM plug-compatibles. That's versatility!

Nobody's made the *universally approved* 2400bps dial modem yet, but with over 100,000 in the U.S. and abroad, we've got the jump. So contact Concord Data Systems, 397 Williams Street, Marlborough, Massachusetts 01752. (617) 460-0808. Telex: 951793.

For fast response, just call us today at 800-CDS-BAUD.

## Concord Data Systems



## COMMUNICATIONS

## Broadband nets unite

From page 33

"The need for high-speed, peer-to-peer communications is what usually drives users to install Ethernet," Presser noted.

Approximately 70% of Chipcom's customers are firms that have Digital Equipment Corp. installations and want to implement the vendor's Ethernet-compatible communications system, Decnet, he said.

Du Pont Co.'s Sabine River Works facility in Texas is in the process of installing the remodulator in order to solve interference problems generated by a Chipcom Ethernet network and a variety of other networks sharing the same broadband cable.

In the last eight years, the site has implemented a video surveillance network, several dedicated links between computers and Sytek's Localnet 20 on the cable.

Localnet 20 links a variety of computers and terminals from Hewlett-Packard Co., IBM and DEC, according to Du Pont senior engineer Randolph Knipp.

### High-speed LAN needed

Approximately one year ago, the Sabine River facility decided it needed a high-speed LAN to link process monitoring and control machines to a technical center where computers perform statistical analysis and optimization.

Because the equipment is predominantly DEC's, Knipp's group chose to implement Decnet communications software on top of Chipcom's Ethermodem.

The initial test implementation worked well, but as soon as a Sytek System 2000 was implemented on the cable, interference problems surfaced.

"It was like two broadcasting stations trying to use the same channel," Knipp said. "We are convinced the remodulator will solve this problem."

Because Bridge's broadband Ethernet runs at 5M bit/sec. rather than 10M bit/sec., users should have no problem implementing it on the same cable as a MAP network, Bridge President William Carrico said.

The Bridge family of broad band Ethernet products supports multiple communications protocols, including the Transmission Control Protocol/Internet Protocol (TCP/IP), the company claimed. The products include the following:

- The communications server CS/1B links eight to 32 hosts, terminals and other devices to a 5M bit/sec. broadband Ethernet network that supports TCP/IP.

The 32-port version is

priced at \$15,600.

- The multipoint bridge MB/1 is an eight-port bridge that enables Bridge and non-Bridge Ethernet products supporting TCP/IP to communicate with devices on the broadband Ethernet. For example, VAX minicomputers can communicate with devices on the network via a Unibus TCP/IP Ethernet controller from Excelan, Inc. The MB/1 enables multiple Ethernet LANs running on other media to be connected via a

broadband backbone. The

bridge is priced at \$10,600.

- The channel remodulator CR/5 resides at the cable head end and performs packet regeneration, frequency translation and collision detection. The product is priced at \$5,000.

- The radio frequency modem RFM/5 interfaces Bridge LAN servers with broadband cable. Its price is \$795.

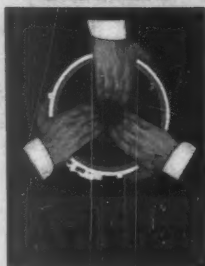
"What we're announcing is a complete broadband product line," Carrico said.

The broadband interface supports the company's full line of Ethernet products, he added.

"We also bring to the party intelligent head ends and modems that automatically compensate for temperature changes, adding or subtracting of workstations and other changes that broadband cable is susceptible to. We're aiming at Ungermann-Bass, Inc., which also offers a 5M bit/sec. broadband Ethernet," Carrico said.

# PEACE BREAKS OUT IN THE MICRO-TO-MAINFRAME CONFLICT.

## TANGRAM ANNOUNCES ARBITER™



### The Micro/Mainframe Cooperative Processing Software Solution.

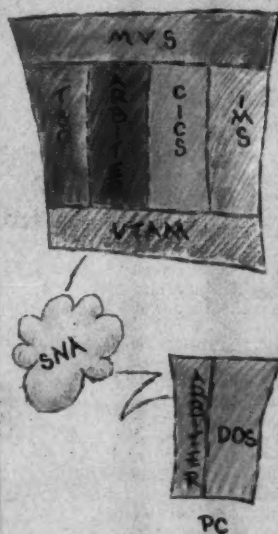
If the microcomputer revolution has you manning the data center barricades...if your communications network is besieged by armies of PCs...if you are fighting running battles over access and data formats and training...

It's time to install Arbitrator, and declare peace.

Much more than a micro-to-mainframe "link" Arbitrator is a Cooperative Processing Subsystem. It operates as a VTAM application, capable of supporting hundreds of PCs without interfering with the performance of your essential development and production subsystems. It is fully compatible with SNA, with a carefully planned growth path into IBM's LU 6.2 protocol and Advanced Program-to-Program Communications.

Arbitrator interfaces directly with VTAM and executes in its own address space, where it presents none of the performance or integrity exposure problems associated with CICS- or TSO-based link products.

Because Arbitrator is a VTAM application, there are fewer layers of software between the PC user and the information, saving processor overhead. Even more efficiency is gained by Arbitrator's advanced data compression scheme that uses your network more effectively than other products that transfer and receive data as 3270 screens.



As a subsystem, Arbitrator is fully compatible with RACF and other popular security software. It also feeds data into IBM's SMF—data you can use to tune Arbitrator. Or use for network capacity planning, usage accounting and auditing.

## SUPER ORACLE™ REPORT WRITER

Create complex reports from your Oracle database with easy one step process. Report format and logic very flexible. Versions for VAX/VMS, IBM PC, DG/MV. Demo available. Contact Stern Consulting, P.O. Box 21171, Cleveland, OH 44121, (216) 397-0551.

Oracle is a trademark of Oracle Corporation



## COMMUNICATIONS

## Faster LAN bridge out

From page 33

Translan III complies with the European T1 2.048M bit/sec. transmission rate and can also support the U.S. 1.54M bit/sec. rate, Schaller said. Translan II sends at 448K bit/sec.

Translan III operates independently of higher level

communications software, because it functions on the data-link layer of the Open Systems Interconnect model, Schaller pointed out.

Vitalink's Translan products were codeveloped with Digital Equipment Corp. and are similar to DEC's Lanbridge 100. While Lanbridge consists of one box that connects two Ethernets at one point, Translan installs an interface on each cable, and it connects the interfaces over a long-distance, high-speed

medium.

In satellite-based networks, the frame-address properties of Ethernet dictate that only the earth station to which the communication is addressed will actually receive that data. In this way, the network performs as a "distributed switch," Schaller said.

connect LANs via several parallel circuits. This feature is valuable because of the redundancy offered in case of line failure, Schaller said.

The parallel-line feature can also provide load leveling or routing of calls to the line with the greatest available capacity, he added.

The product consists of a rack-mounted box with several ports: one for an Ethernet connection; four V.35 ports for digital circuits; one console port; and a printer port.

Vitalink also announced new software that will permit Translan II to communicate with Translan III.

## Vendors use Sun system

From page 33

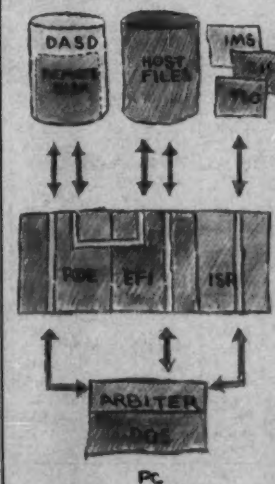
PC-NFS, Sun's recently introduced version of NFS for the IBM Personal Computer and compatibles.

The Multiplex portion of the product provides the data extraction and automatic reformatting capability. The NFS portion provides the communications link and allows for the transparent sharing of these files, Multiplex President James Groff said. The company has been marketing Multiplex to run on a variety of local-area networks. The NFS version, priced at \$1,195 for a single copy, will be available within 60 days of order.

The Wollongong Group of Palo Alto, Calif., will market an NFS option for its Wollongong Integrated Networking/VAX (WIN/VX) software. WIN/VX is an implementation of the Transmission Control Protocol/Internet Protocol communications software running under Digital Equipment Corp.'s VMS operating system. The NFS option will enable users of VAX/VMS systems to communicate with any other system supporting NFS.

The NFS option for WIN/VX is scheduled for shipment in October. It will sell for \$5,000 in single quantity for the VAX version and \$2,500 in single quantity for the Microvax version.

Arbiter has three components. The Remote Disk Environment (RDE) provides a seamless interface to remote disks on the host, which may be accessed by PC users or host application programs. The External File Interface (EFI) transfers data to and from files on the host and the remote disks. The Interactive Session Relay (ISR) allows "power users" to connect a PC to another mainframe subsystem—for example, TSO or CICS—without disconnecting from Arbiter.



Arbiter not only gives the data center more control over the micro/mainframe environment, it increases the ease with which PC users can access mainframe data. Instead of time-consuming file transfers and data reformatting, Arbiter allows the PC user to access corporate data via remote disks—already formatted for Lotus 1-2-3, dBase II or III, or other popular software. Remote disks are accessed exactly like the A, B or C disks attached to the PC.

Arbiter enables your information center to extract data from any host-formatted file structure (e.g., IMS or VSAM) using its existing tools—whether they're COBOL, Pascal, PL/I, SAS\* or FOCUS\*. That data is delivered onto the remote disks in standard PC formats like DIF, WKS and CSV.

To give peace a chance in your data center, call

(919) 481-4444. You can declare an immediate truce by trying Arbiter in your own data center for 30 days, with no obligation. Tangram's technically knowledgeable Account Representatives can help resolve your data communications questions, and offer advice on how Arbiter will fit into your network.

**TANGRAM**  
SYSTEMS CORPORATION

Tangram Systems Corporation  
118 MacKenan Drive, Suite 100  
P.O. Box 5069  
Cary, NC 27511-1999  
(919) 481-4444

\*Arbiter is a trademark of Tangram Systems Corporation. Lotus and 1-2-3, dBase, dBase II and III, SAS and FOCUS are registered trademarks of Lotus Development Corp., Ashton-Tate, SAS Institute, and Information Builders, Inc., respectively.

© Copyright 1986, Tangram Systems Corporation

**DEC  
HOTLINE**  
1-800-221-6318

☒ **VAX**  
M11, 730, 750, 780, 785  
☒ **PDP 11**  
11/23, 73, 11/34, 44, 84  
☒ **PERIPHERALS**  
Fixed & Removable  
Drives, Tape Drives,  
Communications  
☒ **TERMINALS**  
VT220, VT100, LA120,  
LA210, LA50

**Dataware**  
30 Bay St., Staten Island, N.Y. 10301  
(718) 447-4911  
DEC, VAX, PDP11 are registered trademarks of Digital Equipment Corp.



# The Only Distributed Relational Database Solution.

**P**ut INGRES to work in your organization. Because for the first time, you can get transparent access to all your company's data. Even if that data is located on different computers. In different locations.

## THE DISTRIBUTED DATABASE.

With INGRES, you get a truly distributed database. Not just a networked system. Because INGRES is the one RDBMS that works across multiple operating environments. From mainframes to minis to micros. Whether you have a few computers or a few thousand. Which means no matter how large your organization, your data and your applications can be shared. You'll have one consistent relational view of all your data.

The key to your distributed database is INGRES/STAR. Its open architecture gives you universal access to data (supporting multiple vendors' hardware, software and networks), while preserving local control of data integrity and security. Users don't have to worry about where the data is located, how to get it or what type of hardware and operating system are used.

Which means you can build applications and share data that span multiple computers just as easily as if all the data were located on one machine. Your entire company uses one powerful DBMS with consistent, reliable results.

## INTEGRATED APPLICATION TOOLS.

Only INGRES gives you a comprehensive application development environment. With a 4GL that includes SQL, a Visual Forms Editor and host language interfaces (ADA, BASIC, C, COBOL, FORTRAN, PASCAL and PL/I). You'll work in an integrated environment that gives you unprecedented productivity in application development.

Your end-users will find it easy to create forms, queries, reports and graphs, too. Because INGRES's Visual Programming tools give them the decision support capabilities they need. While reducing the MIS application backlog.

## HIGH-PERFORMANCE SQL AND MORE.

INGRES's SQL is broadly compatible with IBM's DB2. So you can stay with the industry standard. And move applications easily and quickly, whenever you want.

You can also count on higher performance. INGRES is uncommonly fast. And provides special support for transaction processing and complex queries. What's

more, INGRES gives you the high levels of data security, integrity and consistency you demand.

So look into the only truly distributed relational DBMS solution. INGRES. You'll see how the INGRES advantage is the key to integrating your dissimilar computers. For more information, call toll-free:

**(800) 4-INGRES**  
From Canada, (415) 769-1400

## Relational Technology

1080 Marina Village Parkway, Alameda, CA 94501

© 1986 Relational Technology

INGRES, INGRES/STAR and Visual Programming are registered trademarks of Relational Technology. IBM and DB2 are trademarks of International Business Machines Corporation.

## JOIN US FOR A FREE INGRES SEMINAR. CALL (800) 4-INGRES FOR A TESTIMONIAL.

<b>AL</b> Birmingham . . . Sep 16	<b>MO</b> St. Louis . . . Aug 19
<b>AZ</b> Phoenix . . . Oct 14	<b>NC</b> Research Triangle Park . . . Oct 14
Tucson . . . Jul 17	Winston-Salem . . . Sep 23
<b>CA</b> Los Angeles . . . Jul 16	<b>NE</b> Omaha . . . Sep 9
Sep 25	<b>NJ</b> Iselin . . . Sep 9
Nov 20	<b>NM</b> Albuquerque . . . Aug 26
Newport Beach . . . Oct 1	<b>NY</b> Albany . . . Nov 5
Sacramento . . . Oct 28	New York City . . . Sep 9
San Diego . . . Oct 8	Oct 21
San Francisco . . . Aug 12	Dec 9
Oct 15	Rochester . . . Aug 20
Dec 3	<b>OH</b> Cincinnati . . . Nov 20
Sunnyvale . . . Oct 1	Cleveland . . . Oct 15
Nov 19	Columbus . . . Dec 10
<b>CO</b> Denver . . . Nov 11	Toledo . . . Nov 18
<b>CT</b> Stamford . . . Oct 23	<b>OK</b> Oklahoma City . . . Dec 4
<b>DC</b> Washington . . . Aug 28	<b>OR</b> Portland . . . Oct 29
Nov 19	<b>PA</b> Philadelphia . . . Sep 16
<b>FL</b> Jacksonville . . . Nov 19	Pittsburgh . . . Nov 12
Oct 16	<b>TN</b> Nashville . . . Nov 6
Orlando . . . Dec 16	<b>TX</b> Austin . . . Oct 21
<b>GA</b> Atlanta . . . Aug 26	Dallas . . . Nov 5
<b>IA</b> Des Moines . . . Nov 18	Houston . . . Nov 11
<b>IL</b> Chicago . . . Aug 14	<b>VA</b> Richmond . . . Dec 11
<b>IN</b> Indianapolis . . . Dec 2	<b>WA</b> Seattle . . . Oct 9
<b>KY</b> Louisville . . . Sep 30	
<b>LA</b> New Orleans . . . Dec 16	
Shreveport . . . Dec 10	
<b>MA</b> Boston . . . Sep 24	
Burlington . . . Oct 2	
Newton . . . Dec 4	
<b>MI</b> Detroit . . . Sep 11	
<b>MN</b> Minneapolis . . . Oct 23	
<b>MO</b> Kansas City . . . Sep 18	

## CANADIAN SEMINARS:

Calgary . . . Sep 17
Montreal . . . Sep 25
Ottawa . . . Oct 30
Quebec . . . Sep 10
Toronto . . . Nov 13
Winnipeg . . . Oct 14

**INGRES. The Distributed SQL Relational DBMS.**



# SYSTEMS & PERIPHERALS



**HARD TALK**  
Donna Raimondi

## The great tape debate rages

**A**llegations that chromium dioxide cartridge data tapes may not be suitable for archival storage are drawing heated reactions from chromium dioxide's developer and from IBM, one of its major users.

Last month in this column, *Computerworld* aired the opinions of physicist William Manly, a consultant to the magnetic recording industry [CW, June 9]. Manly claimed that chromium dioxide-based tapes — such as the ones used by IBM in its 3480 cartridge tape system — are potentially toxic and short-lived.

Du Pont Co., the inventor and major marketer of the chromium dioxide magnetic particles used on the tapes, and IBM, which uses its own formulation of the material in its 3480 magnetic tape subsystems, take strong exception to Manly's views.

Manly, of HMI Consulting in Arlington, Texas, based his claims on his more than 20 years of experience with tape technology, including research work at tape manufacturer Ampex Corp. He stated that chromium dioxide degrades in the presence of moisture and oxygen to form chromium hexavalent compounds that are highly poisonous.

He further said that the tapes based on chromium dioxide have not been sufficiently tested to determine if they will last long enough to be useful for archival storage.

"Long-term testing has verified that our formulation of materials and manufacturing processes has produced a data processing tape product

See **GREAT** page 46

Raimondi is a Computerworld senior writer.

## GE offers data base system

### Office package combines GEsan and Microvax II

By James Connolly

RALEIGH, N.C. — Seeking to expand its market from the federal government arena into the corporate world, General Electric Co.'s Silicon Systems Technology Department has announced a turnkey data base system.

GEfile includes GE's GEsan hardware and software sequential search and retrieval data base system as well as a Digital Equipment Corp. Microvax II minicomputer. The GEsan elements have been available previously through GE's Aerospace Division, which had sold 35 of the systems to the federal government. The earlier GEsan systems were integrated by the customers with larger DEC VAX superminicomputers.

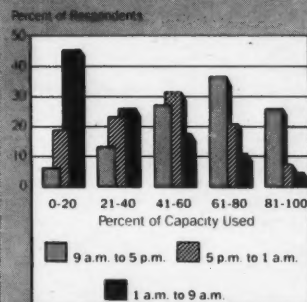
"What we have recognized is that over the past couple of years in the government applications, the application there is not unique to government ... but has broad commercial application. So in transferring the GEsan group down into the semiconductor business division, there is a commitment to take the GEsan product to commercial markets, as well as introduce specially configured products that meet specific applications and commercial markets," said Bill Geiger, manager of GEsan marketing.

While GEsan has been used by the government primarily in defense and intelligence applications, GE says it is useful for maintaining text data bases in fields such as the legal profession, sales and engineering, according to David Morris, manager of GEsan products. Target customers include organizations that have no access to mainframe data base management systems

See **GE** page 44

### DATA VIEW

#### Imbalance of power: Capacity utilization by time of day in large DP shops



Information provided by an International Data Corp. survey of 755 large users, November 1985.

## Priam unveils RT PC drives

By James Connolly

SAN JOSE, Calif. — With claims of price advantages over comparable IBM products, Priam Corp. has introduced a series of 5¼-in. Winchester disk drives designed for use with the IBM RT Personal Computer workstation.

Priam officials claimed its Innerspace family of add-in disk drives and Storage-space ED series of external drives provide capacities comparable to IBM disk drives, which cost up to twice as much. Each model is available with a controller that allows addition of a third disk drive to the RT PC.

The Innerspace 43M-byte and 62M-byte drives were designed for use with the floor-standing RT PC Models 20 and 25. The add-in kits cost \$1,398 and \$1,798 for the 43M- and 62M-byte versions.

The Storage-space ED drives were designed to fit beside the desktop RT PC Model 10. Prices range from \$1,995 to \$2,395.

### INSIDE

CIE Systems offers an IBM-compatible color terminal/43

Tandem Computers unveils a 1,600 line/min printer designed for high reliability/43

Integrated Solutions adds Motorola 68020 and Unix-based nodes for heavy computational loads/44

### NEW THIS WEEK

- Seikosha offers monochrome-to-color printer
- Laserlink announces add-on board for Canon laser printer

■ For more on these and other new products, see pp. 91-102.

### INSTANT ANALYSIS

"If iron oxide tapes will last 30 years, so will chromium dioxide tapes."

— Robert Baer, Du Pont Co., on questions about the durability and safety of chromium dioxide tapes

## Manufacturer pushes system to capacity and beyond

### Upgrade not always preferable way to grow

By Rosemary Hamilton

PINE HILL, Ala. — Instead of trying something new, Jim Bonner, director of information services at MacMillan Bloedel, Inc., says he believes in maximizing the potential of what he has.

A Hewlett-Packard Co. user for five years, Bonner has tentative plans to upgrade his system later this year. However, he says he will not consider a move to the vendor's highly touted reduced instruction set computer (RISC) systems because his conventional HP 3000 minicomputer has adequately served his company's information needs.

Bonner says there is a 70% to 80% chance that by year's end his company will purchase a traditional architecture HP 3000 Series 70, a system announced earlier this year with the debut of the RISC systems, formally known as the HP Precision Architecture computers.

The Series 70 was offered as an upgrade to the HP 3000 Series 68. It is said to offer 30% more performance than the Series 68 and costs \$30,000 as a field upgrade.

"We're very interested in the RISC systems and have enough confidence in HP to believe that what it's selling will work," says Bonner, whose firm is the U.S. subsidiary of MacMillan Bloedel, Ltd., a Canadian producer of lumber and paper. "But our business is in a constant state of generating information. I don't have an adequate

plan should we get behind. So I wouldn't bring in a solution until it's proved itself in the marketplace."

Furthermore, Bonner says, his department has been able to expand the capabilities of the HP 3000 beyond its traditional use as a business computer by adding proprietary applications for the production processes, the heart of MacMillan Bloedel's business.

The U.S. operation is made up of the Pine Hill headquarters, a sales office in Atlanta and 15 plants along the East Coast. Bonner estimates that the company produces 65 million feet of structural grade lumber, 135 million square feet of plywood, 430,000 tons of liner board and 210,000 of corrugating board each year.

MacMillan Bloedel now uses two HP 3000s. A Series 68 with 5M bytes

of main memory is used for office applications, and a smaller Series 40 with 1M byte of memory is used to manage the company's production processes.

Approximately 40 HP Touchscreen Personal Computers and 68 HP terminals are located throughout the U.S. offices and linked to the minicomputers via the HP Distributed Systems Network link.

The centerpiece of this system is the HP Image data base management system, Bonner says. MacMillan Bloedel uses in-house applications to interface with Image for both the administrative and production sides of the business. As a result, production data on such items as raw material are immediately available to sales personnel.

See **MANUFACTURER** page 44



# THINK TWICE



## ...BEFORE YOU SETTLE FOR SAS.

Have you found your application solution? Think twice...if you haven't found SPSS-X.™ Does your staff spend time doing what users might do for themselves? Provide them with the tools and support from SPSS.

For end users, SPSS has 20 years' experience providing fourth generation solutions. Data management, statistics, tables and report writing. And interactive graphics and maps with SPSS Graphics.™ Nearly three quarters of a million users agree. Speak plain English—not a programming language. Rely on superb documentation, training and a technical hot line.

For DP professionals, satisfied users increase staff productivity. And SPSS-X is the system staff's own tool to track resource utilization and spot performance problems. SPSS-X runs faster and conserves machine resources, so performance won't suffer when SPSS-X goes to work.

For all users, SPSS-X is part of an integrated family of products available in over 40 different computing environments, from mainframe to micro. Satisfy your micro users with the market leader, SPSS/PC+, including complete SPSS-X mainframe communications.

So think twice before you settle for less than SPSS-X. Contact our Marketing Department today.

**CALL 1/312/329-3660**

**SPSS inc.**

SPSS Inc. • 444 North Michigan Avenue, Suite 3000 • Chicago, Illinois 60611

In Europe: SPSS Europe BV • P.O. Box 115 • 4200 AC Gorinchem, The Netherlands • Telephone: +31183036711 • TWX: 21019

SPSS-X currently runs on IBM OS, DOS and CMS; Digital 10, 20 and VAX™; PRIME; Univac 1100; and Data General MV8000 systems. SPSS, SPSS-X, SPSS Graphics and SPSS/PC+ are trademarks of SPSS Inc. for its proprietary computer software. SAS is a registered trademark of SAS Institute, Inc. © 1986, SPSS Inc.



## SYSTEMS &amp; PERIPHERALS

## CIE Systems terminal out

Said to offer color,  
improved resolution

By James Connolly

IRVINE, Calif. — CIE Systems, Inc. has introduced a color terminal that reportedly is plug compatible with IBM's 3179 and 3279 terminals and that provides a 25% improvement in screen resolution.

CIE Systems, a subsidiary of C. Itoh Electronics, Inc., claimed that the CIE 7900 Executive Color Terminal improves text readability through use of a .28-mm dot pitch.

It also uses a 122-key keyboard for 3179 compatibility or an 87-key keyboard for 3279 compatibility.

#### Function as monochrome terminal

In addition, the company claimed the terminal can function as an IBM 3178 or 3278 monochrome terminal in a coaxial environment or as a Digital Equipment Corp. VT100 in an RS-232 asynchronous environment.

The terminal, which was announced at the 1986 National Computer Conference, costs \$1,695.

CIE Systems also has announced that its Laser Optical Filing System (LOFS) will now be distributed through vertical market resellers, as well as through existing private-label channels in the general office industry.

## Portable terminal ties to IBM minis

By James Connolly

LAGUNA HILLS, Calif. — Informer Computer Terminals, Inc. recently introduced a 14-lb portable terminal and a controller for use with IBM System/34, 36 and 38 minicomputers.

The System 300 Subsystem includes the Informer 251 terminal and the Informer 291 twinaxial remote terminal controller. The products provide all IBM 5251 and 5291 functions, including status line, field separation and keyboard emulation.

"The unique advantage offered by the Informer System 300 is its ability to connect remote users via standard public phone lines," company President Lars Persson said. He said the terminal is particularly suited for users who travel and need access to their company's central data base.

According to the vendor, users can support up to seven Informer 251 terminals to the Informer 291 through RS-232 lines or through an integral modem contained within the Informer 251.

The terminal costs \$2,190, and the controller costs \$2,545.

#### CORRECTIONS

The Tandem Computers, Inc. Nonstop VLX system [CW, April 21] can grow from a four-processor base in single-processor increments up to a maximum of 16 processors in a system.

LOFS, introduced in the U.S. in November 1985, is an optical filing system that the company claims will replace paper-based filing systems that require repeated access to information.

Officials of CIE Systems said that more than 25 of the LOFS systems manufactured by Hitachi, Ltd. are now installed in the U.S., and several hundred systems have been installed in Japan.

The system reportedly relies on data and image compression techniques to store digital images of up to 60,000 letter-size documents on a single 12-in. optical disk.

The single-unit, end-user price is \$125,000.

## Tandem Computers line matrix printer targets high throughput environments

By James Connolly

CUPERTINO, Calif. — Tandem Computers, Inc. last week added to its line matrix printer family with a printer designed for use in environments requiring high throughput and high reliability.

The 5518 line matrix printer reportedly prints at 1,200 line/min using standard fonts and at 1,600 line/min using an optional high-speed font.

The company said that the printer's reliability is improved because of the mechanism's small number of moving parts. The printer reportedly requires no scheduled maintenance.

Microprocessor controls are said to isolate most failures at the board level, according to Tandem officials.

"Through the use of advanced line matrix technology, we are offering our users a high-performance printer that combines versatility with high speed and high throughput. This technology provides a degree of reliability that complements Tandem's Nonstop computer systems," said Lawrence A. Laurich, vice-president of engineering for Tandem.

Existing members of the line matrix printer family are the 300 line/min 5515 and the 600 line/min 5515. The 5518 costs \$32,000.

Six words that tell the story of quality service. Confirmed by the vast majority of TRW customers.\*

Tough customers with high expectations for their third party maintenance and repair company.

Like the knowledge to reduce downtime for everything from mainframes to micros — and a commitment to keep the cost of maintenance and repair down.

Plus the capability to service diverse products. IBM, DEC, and dozens of other sys-

tems from single office installations through nationwide networks. Over 1,400 products in all.

If you have high expectations for your service company, call 1-800-257-7464 today. (In New Jersey, 201-575-7110, Ext. 100.)

Whatever your requirements, regardless of your expectations, we want to hear from you.

Service solutions for tomorrow. They're taking shape at a company called TRW.

TRW Customer Service  
15 Low Drive  
P.O. Box 2078  
Fairfield, NJ 07007-2078

\*Based on a national survey in which 91.7 per cent of all respondents indicated TRW was "meeting or exceeding" their service expectations.

**TRW**

**Nationwide Service From  
A Company Called TRW**



## SYSTEMS &amp; PERIPHERALS

## Unix-based nodes unveiled

By James Connolly

SAN JOSE, Calif. — Integrated Solutions, Inc., a subsidiary of NBI, Inc., has introduced two Unix-based nodes designed for users who run heavy computational loads without graphics.

The cluster compute node and the diskless compute node are based on the Motorola, Inc. 68020 microprocessor and VMEbus and the Integrated Solutions TRFS extension of University of California at Berkeley Unix 4.2.

According to an Integrated Solutions official, the cluster compute node was designed to overcome the limited peripheral access of Ethernet.

The cluster compute node utilizes a 20M bit/sec. backplane for inter-network communications as well as private buses for accessing 4M bytes of memory.

It is priced at \$5,900.

### Field-installable

The company spokesman said the clusters are field-installable into existing Integrated Solutions Optimum V systems.

The diskless compute node is reportedly priced at \$6,900 and is packaged in an eight-slot desktop enclosure.

It is said to feature four VME-expansion slots, 4M bytes of memory and an Ethernet controller.

## GE releases office data base system

From page 41

and want data base systems that can be installed in an office.

Morris said GEfile is available in three configurations, each being built around GEsCan and the Microvax. The GEsCan system reportedly handles searches in a background manner, freeing the Microvax to handle other queries or general data processing. The GEsCan connects to the Microvax's Q-bus via a direct-memory access interface card.

GEfile 1200 is the base system and includes a Microvax with 2M bytes of memory, a 120M-byte disk drive and a T3 version of GEsCan. The T3 ver-

sion includes a backplane and a T3 board with three text array processors. The GEfile 1200 was designed to store up to 50,000 pages of text and costs \$64,900.

GEfile 3300 includes a Microvax with 5M bytes of memory, a 330M-byte disk drive and two three-processor boards. It costs \$79,000.

GEfile 6600 was designed to handle 500,000 pages of text and includes 9M bytes of memory in a Microvax, 660M bytes of disk storage and a T12 version of GEsCan with four three-processor boards. It costs \$98,000.

Morris said GE provides users with the object code for GEsCan, which includes the ability to build a data base. It also includes features such as query, audit trail, print, a thesaurus and what Morris called "current answer." The current answer feature, he said, allows a user to be notified when files are updated with data relevant to an earlier query.

Query options include a menu, a command-driven language and a single-time find, in which a user types in descriptions of the needed data. Morris said GEfile can handle queries of up to 3,000 characters, whether in a single query or multiple queries. Multiple queries are processed in parallel, he added.

Morris claimed that the system will search as fast as it takes to get information off the disk and that the system will display the first answers it gets from the data base even while searching for more query matches.

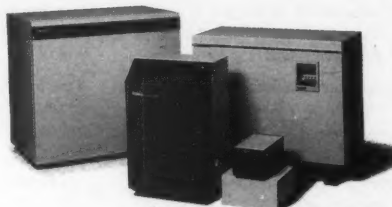
## MADE FOR EACH OTHER.



Just like Topaz Power Conditioners and your computers.

Noise transients, voltage fluctuations, blackouts—all are problems for computers. But Topaz eliminates these problems with a full range of products: LINE 2" Power Conditioners, ULTRA-ISOLATOR" Noise Suppressors and POWERMAKER" Uninterruptible Power Systems.

Reliable. Affordable. Efficient. Our products are ideal for use with all computers, from micros to mainframes. Call us today at (619) 279-0831. After all, we're made for each other.



**TOPAZ**

Excellence in Computer Power  
A Subsidiary of the Square D Company

For your FREE copy of our 16" x 20" MADE FOR EACH OTHER poster, please tear out this ad and send it to us along with your name and address.  
Mail to: Topaz, Inc. 9150 Topaz Way, San Diego, CA 92123-1864.

## Manufacturer pushes capacity

From page 41

Bonner says the company has developed its own software for two reasons. On the administrative side, some of the software has come from the parent company, where Bonner said there is a policy that their business is unique enough to warrant customized applications.

On the production side, Bonner says he could not find off-the-shelf applications for less than what it would cost to develop them in-house.

### Originally leased IBM systems

The company originally chose HP in 1980 after using a number of different IBM systems on a lease basis, including the 360 Model 20 and the Series/1. At that time, the company operated in a batch environment. The same raw material data that can now be transmitted to the sales office immediately once took anywhere from 24 to 48 hours to process.

When MacMillan Bloedel decided to move from a batch environment, it wanted to purchase an IBM system. It chose the System/38 but then discovered it would have to wait a year for delivery, Bonner says. "We just didn't feel we could wait 12 months for IBM," he adds.

In addition to offering "terminal orientation and a good data management system," HP was one of the few vendors that could offer an adequate service contract, Bonner says. "We're about 100 miles from the closest city, and we found many companies couldn't fulfill our service requirements."



# LOTUS INTRODUCES THE APPLICATION CONNECTION.™

It connects  
personal computer  
applications

mainframe  
applications

communication links

and other  
PC  
applications

offering new  
levels of  
productivity and  
effectiveness

while enhancing the  
corporate investment in the  
hardware and  
software systems  
already in place.

## Lotus The Application Connection

*One product line of PC and mainframe software from Lotus connecting many existing PC applications, micro-to-mainframe links and mainframe applications.*

© 1986 Lotus Development Corporation. Lotus is a registered trademark of Lotus Development Corporation.  
The Application Connection is a trademark of Lotus Development Corporation.



## SYSTEMS &amp; PERIPHERALS

## The great tape debate rages

From page 41

that is highly reliable," IBM respond-

ed in a formal statement. "The chromium dioxide tapes are suitable for archival storage and safe for handling and use by our customers," the statement continues.

Du Pont's Dr. Bruce Karrh, vice-president of safety, health and environmental affairs, says, "About the

only way you could be exposed to an unacceptable amount of chromium dioxide is in the manufacturing process."

Tapes that use chromium dioxide can be disposed of in the same manner as any other tape, he says about Manly's assertion that chromium dioxide tapes would have to be disposed of as a toxic waste, in a government-approved fashion.

### Allegations unfounded

Manly's allegations are misleading and unfounded, the IBM statement says. "The magnetic particles in chromium dioxide-based tapes are fully encapsulated in an inert, non-toxic polymeric binder system."

IBM says that there is little likelihood of any dangerous degradation

of the tapes in normal handling, and that both Du Pont and IBM tests show that the material meets U.S. Environmental Protection Agency requirements.

As for the longevity of the tape, Du Pont's Robert Baer, marketing manager for chromium dioxide, says there is no reason to believe that the tapes will last fewer years than the competing iron oxide-based reel tapes.

Du Pont performed aging studies with chromium dioxide-based tapes that indicate long life spans. "We believe that if the data center follows the tape manufacturer's recommendations, the chromium dioxide tapes will be absolutely functional for a long time. If iron oxide tapes will last 30 years, so will chromium dioxide tapes."

### Temperature, humidity tests

The Du Pont aging studies consist of placing pieces of magnetic tape in a magnetometer and subjecting the

tape to 65°C temperature and 50% humidity conditions for various periods of time.

Seven days in the magnetometer correlates well with real-life conditions to the tape's magnetic flux over a one-year period, Baer says.

It is the tape's magnetic flux that is being measured.

### First-year loss

"Most of the magnetic flux loss that you will encounter occurs in the first year, and then to a much more limited extent in the second and third years. Beyond that, there is little change in magnetic flux character in all the chromium dioxide tapes we have ever examined — both tapes that we made and other people's," Baer says.

Typically, 10% to 20% of the magnetic flux demagnetizes over the first two years, but this does not mean that 10% to 20% of the data written to the tape degrades.

It means that 10% to 20% of the surface of each of the many billions of mag-

netic bars on a section of tape converts from magnetic to nonmagnetic types of chromium.

Baer says that tape product designers build their hardware around the minimum flux that remains after the 10% to 20% degradation.

### 'Long-term stability'

"Results of tests clearly prove the long-term stability of the recorded signal," IBM says.

"As a matter of fact, IBM has provided a five-year product warranty on all 3480 chromium dioxide cartridges ever since we introduced the product," the IBM statement continues.

IBM started shipping the product early in 1985, but the company has been buying the chromium dioxide particles from Du Pont for at least six years, according to Du Pont's Baer.

### Performance requests

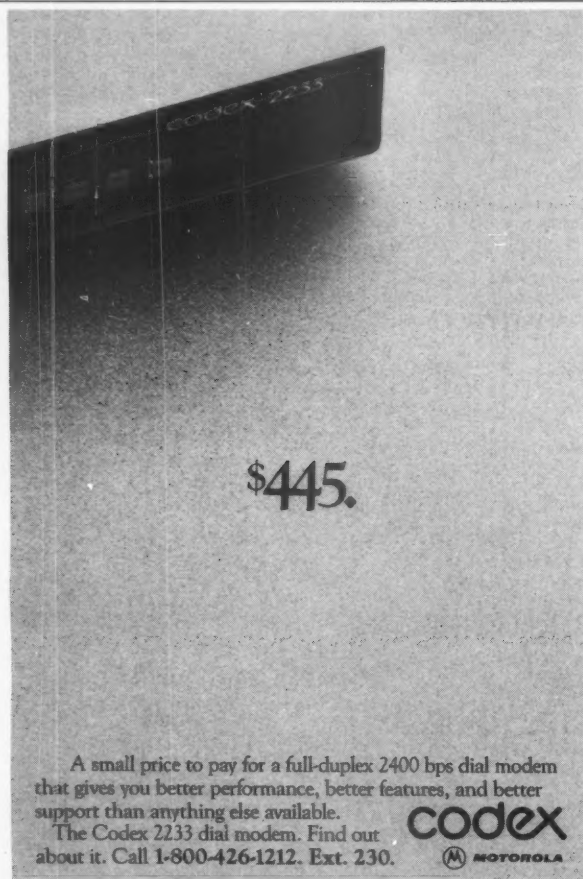
Manly urged readers to ask their tape manufacturers for iron oxide-based tapes with performance equivalent to the chromium dioxide. He stated that manufacturers could supply the tape if customers asked for it.

But Baer says he doubts that one can get chromium dioxide performance out of iron oxide tapes. Iron oxide particles, used in reel tapes for many years, are not suitable for IBM 3480 cartridge tape, because they do not fit the system's high density requirements.

"The old iron oxide just will not work," he says.

There is a new iron oxide formula, but it has not been on the market long enough to determine if it is useful for cartridge tapes, according to Baer.


"The difference between the old iron oxide and the new one, that could possibly work with 3480 technology, is that the new one is doped with cobalt," he says. "We have tested cobalt tapes, but we don't know yet if they would work satisfactorily in a 3480-type environment."



**\$445.**

A small price to pay for a full-duplex 2400 bps dial modem that gives you better performance, better features, and better support than anything else available.

The Codex 2233 dial modem. Find out about it. Call 1-800-426-1212. Ext. 230.

**codex**  **MOTOROLA**

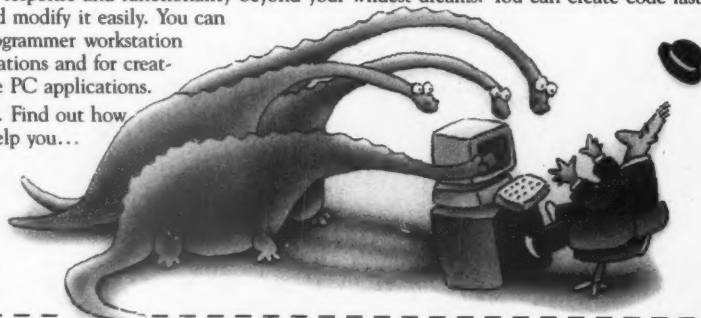
Motorola and ® are trademarks of Motorola, Inc. Codex is a registered trademark of Codex Corporation. © 1986 Codex Corporation.

## More COBOL productivity...

...than you ever thought possible. Micro Focus' productivity tools are closely integrated to give you interaction, speed of response and functionality beyond your wildest dreams. You can create code fast, test it thoroughly and modify it easily. You can use your PC as a programmer workstation for mainframe applications and for creating high performance PC applications. COBOL has evolved. Find out how this evolution can help you...

**MICRO  
FOCUS**

2465 East Bayshore Road  
Palo Alto, CA 94303  
Telephone: (415) 856-4161



Yes, I'm interested in the widest range of development products for PCs.

CW 7/14

Programmer Workstations:  
☐ VS COBOL Workbench  
☐ Professional COBOL

Compilers:  
☐ VS COBOL Compiler  
☐ High Performance Level II COBOL  
☐ Level II COBOL/ET  
☐ Mac COBOL

Development Tools:

☐ ANIMATOR  
☐ FORMS-2  
☐ CO-Graphics  
☐ CO-Maps  
☐ CO-Math  
☐ micro/SPF

Application Generators:  
☐ Sourcewriter

Single-user \_\_\_\_\_ Multi-user \_\_\_\_\_ PC DOS \_\_\_\_\_ Unix \_\_\_\_\_ Other \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_ Phone \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Send to: Micro Focus, Inc., 2465 East Bayshore Road, Palo Alto, CA 94303

Level II COBOL, VS COBOL Workbench, ANIMATOR, FORMS-2, Professional COBOL, CO Maps, Mac COBOL, and CO-Graphics are trademarks of Micro Focus Limited. micro/SPF is a registered trademark of Phoenix Systems, Inc. Sourcewriter is a trademark of Software Systems Limited.



# HOW TO BE IN 6 PLACES AT ONCE.

Only a Falco 500 Multi-Host Terminal can open windows onto all these worlds—today.

No other product in its class delivers productivity like the Falco 500 Multi-Host Terminal.

## 1. THE ANSI WORLD OF DEC MINICOMPUTERS.

Because no one can match its high-performance specs. Which are—in a word—spectacular.

For openers, take the Falco 500's multi-host capabilities. They let you communicate with separate computers through two bidirectional ports—concurrently. Ports that can be configured automatically

## 2. THE UNIX WORLD.

as RS232C or RS422. So

you can enter or retrieve data from any of the computer worlds shown here—plus hundreds of others. And switch between any of them with a single keystroke. No other terminal today offers this kind of multi-host capability. Period.

Then too, nobody does win-

dows like the Falco 500. Nobody. It lets you create six windows on one screen—each one configured as a separate terminal. That means each one has its own operating

## 3. THE REMOTE TELECOM WORLD.

mode, compatible with virtually all ANSI and ASCII terminal protocols. Plus its own set of 64 programmable function key levels. And its own segment of dedicated display memory. Meanwhile, the competition's only got split screens. No contest there, either.

## 4. THE ELECTRONIC-MAIL WORLD.

Maybe you don't need to talk to this many applications from a single terminal—today.

But if you're getting ready to install multiple computers or replace single-function terminals—don't. Until you look at the Falco 500.

It's the only terminal that lets your operators be in six places at once—getting lots more work done. And the only one that doesn't mind if those places are ANSI- or ASCII-oriented; mainframe, mini or micro; or located in an office, factory or engineering lab. Plus the

## 5. THE LOCAL AREA NETWORK WORLD.

adaptability of the Falco 500 means you no longer need several terminals doing just one thing at a time. Because it does six things on one terminal—half a dozen on another.

To start opening windows today on a more productive, multi-host world, contact your

## 6. THE ASCII WORLD OF SUPERMINIS AND MICROS.

Falco distributor.

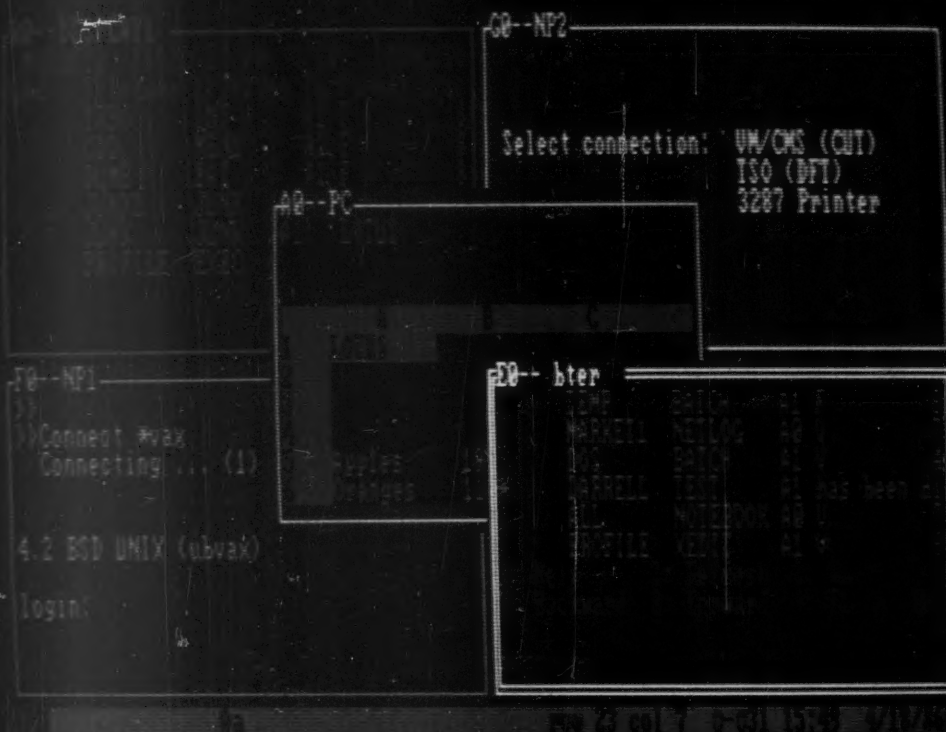
For the one nearest you, contact Falco Data Products, 1294 Hammerwood Avenue, Sunnyvale, CA 94089; (408) 745-7123. Toll-free (800) 835-8765.

# FALCO 500

THE SPECTACULAR  
PRODUCTIVITY MACHINE.







Net/One® is the one local area network delivering true freedom of connectivity now. With our new 3270 Personal Connection®, Net/One turns the PCs you already have into the universal workstations you need now.

Now one person, with one personal computer, can access information on one screen from a DEC host, an IBM® host, and another PC down the hall, while a network

print server is cranking out hard copy.

The Net/One 3270 Personal Connection runs up to five activity windows from different environments concurrently. All with the PCs you have now. Maintaining the applications functions you use now. While delivering significant gains in productivity, such as file transfers up to 10 times faster than you've seen, until now.



# With Net/One, the universal workstation is already on your desk.

All because Net/One is the complete, one-stop LAN system solution. Office, factory, laboratory, campus. PC to mainframe. Vendor-independent. Supporting major LAN technologies and standards.

And because Ungermann-Bass can supply all that's required, including design, installation, training and support, you're free from worry about accountability for your

entire network. You always know just who to call. Try it right now, and see if you don't get the kind of network response you're looking for.

Ungermann-Bass, Inc. 3900  
Freedom Circle, Santa Clara, CA 95052,  
(408) 496-0111.

 **Ungermann-Bass**  
The Net/One Company





## With the IBM System/36 PC, you can run your business from here.



This surprisingly small IBM System/36 PC has the power to keep any size business moving. At a surprisingly small price.

Connect the System/36 PC to your IBM Personal Computer, and you have the power to build your fortune without spending one.

And you also have a system that's part of the System/36 — IBM's most popular multi-user computer family. Which gives any business access to the broad range of System/36 software as well as PC software.

The basic System/36 PC, a processor and a personal computer, easily operates as a standalone system in a small business. Or, for expansion in a larger organization, together by connecting a combination of IBM PCs, System/36 terminals or compatible printers. So you can share information and resources.

And yet, with all that power, the System/36 PC processor is so small, it fits under your desk, on top, or next to it. Wherever you put it, you can run a successful business from the best position.

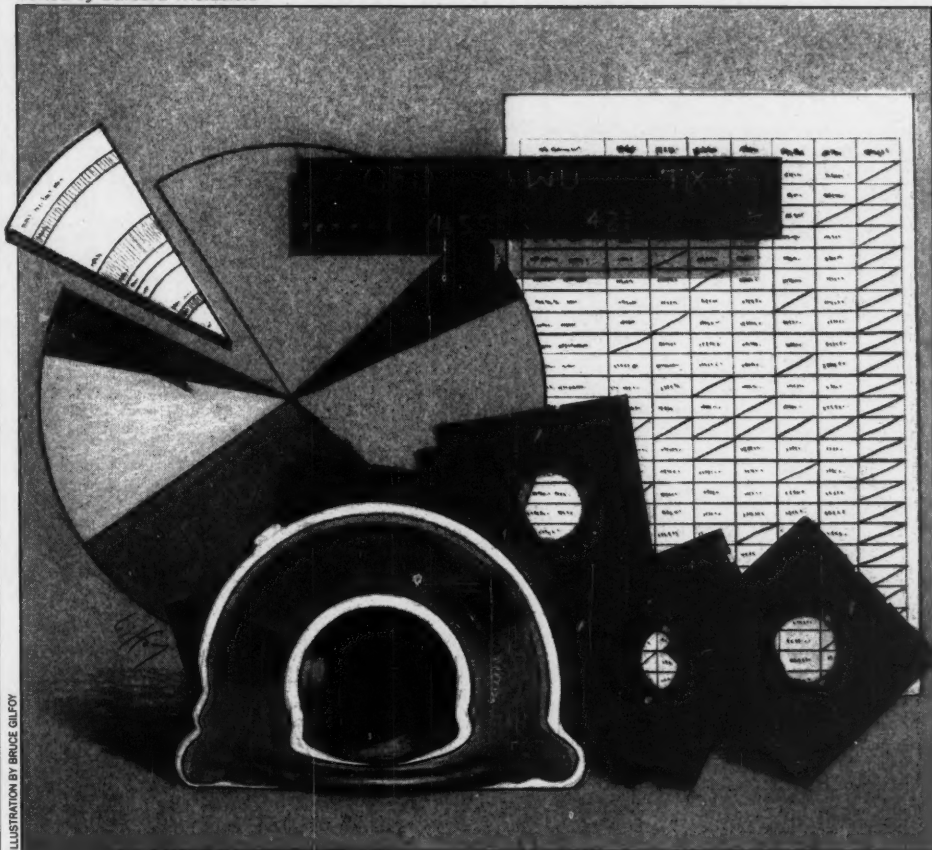
For a free brochure on the IBM System/36 PC, or for information on product availability from participating Authorized IBM PC Dealers, Value Added Dealers or IBM Product Centers, call 1 800 IBM-2468, ext. 090/LD. Or call your marketing representative. And be sure to ask about IBM Credit Corporation financing.

**IBM**



# Product Spotlight

Edited by Barbara Wierzbicki



## INSIDE

**Problem solving with expert system tools/52**

**User report: Shells in commercial business applications/54**

**Comprehensive chart of expert system development shells/59-60**

## Expert system shells

### Design tools help MIS answer management's call

By MICKEY WILLIAMSON

Exaggerated claims for their effectiveness abound and so do skeptics' retorts. But the fact remains that within virtually every company in the Fortune 1,000, key management is deciding what repetitive or complex decisions could profitably be turned over to a computer endowed with a bit of intelligence.

Developing, or even advising on the development of, an expert system can be a daunting prospect to the MIS manager — particularly because the problems that expert systems attack differ fundamentally from those with which the DP manager is most familiar.

In the traditional data processing paradigm, problems are well defined. You can draw a flowchart and enumerate the control structure at every possible branch point. Logic finds data and decides what to do next.

The kinds of problems that management — and expert systems — attack are less well structured.

Data may be incomplete or of uncertain accuracy. The MIS manager, whose training did not include ways of conducting heuristic searches through mountains of imprecise and possibly conflicting data, may find himself lost in a world where educated guesses and rules of thumb come into play. Control must be implicit: Data finds the rules that apply and decides what to do next.

Think of an expert system as a three-legged milking stool. One leg consists of the system's knowledge base: rules, static data, good guesses — anything an expert puts to use in solving a problem. (Anything except intuition, that is. Intuitive reasoning is still beyond the capability of any hardware and software combination.) An expert system's knowledge base may come from one or a number of human experts, from written materials or both.

The second leg is the expert system's inference engine: the way it applies information in the knowledge base to the problem at hand, the route it takes in applying data to the rules of the case.

The third leg — without which the system cannot stand — consists of information about a specific problem that the user wants solved. This information is supplied at runtime, either by the

**Expert systems will soon be a given in software technology. Their developers — whether within DP or elsewhere in the company — will look to MIS for technical aid and comfort.**

*Williamson, a technical journalist based in Warwick, Mass., is the author of Artificial Intelligence for Microcomputers (Simon & Schuster, Inc., 1986). She is currently writing a book on building expert systems.*



## Design tools help MIS answer call

Continued from previous page

user or by routines in the expert system that look for data from external sources.

In the data processing shop, expert systems could solve some vexing problems. "There is the whole question of training and staffing, having the old hands leave the environment and bringing in new people," says Michael Stock, vice-president of advanced systems development at Composition Systems, Inc., an Elmsford, N.Y., company developing expert systems for newspaper production (see story page 50). A system incorporating the expertise of a programmer who is due to retire could train his replacement not only in the ways of data processing tools but also specifically in the ways they are used at a particular site, Stock explains.

Then there is the area of configuration analysis, performance monitoring and tuning. Probably the most successful expert systems in use today are Digital Equipment Corp.'s Xcon and related systems, which advise on the configuration and siting of every VAX computer that DEC sells. An inventive MIS manager could do worse than to consign his department's expertise in identifying bottlenecks and expert capacity to an expert system, according to Stock.

Building systems such as these requires capturing expert knowledge, encoding it in computer-readable form and giving the computer some means of reasoning and some kind of I/O system for rendering its advice.

Fortunately, a variety of tools exist that solve many of the design problems and let the developer concentrate on the user interface and on acquiring and expressing the expert knowledge on which the system will be based.

Expert system development tools, or shells, as they are often called — although some vendors object to the latter term because of the fragility it implies — come in a wide variety of sizes and shapes. These range from \$50 personal computer-based packages — useful for exploring the possibilities that inference engines offer — through serious PC systems with far-ranging capabilities, to mini and mainframe development systems with price tags in the tens of thousands of dollars. Some of these run on dedicated symbolic processing machines that boost entry costs into the six-figure range.

Joseph Carter, senior manager in the consulting division of Arthur Andersen & Co., based in Chicago, categorizes expert systems and the characteristics of shells best suited to them in the following way:

**Advisor systems** represent the category most commonly associated with general expert system use. While these shells are typically rule-based, the more complex knowledge

Continued on next page

## Market for expert system shells breaking new ground

By SUSAN MESSENHEIMER

Since its modest beginnings in 1984, the commercial market for expert system tools has gained strength — and vendors. With the arrival of personal computer-based expert system tools, the market divides into two distinct sectors based on the kind of hardware upon which expert system tool software operates.

By the end of 1985, some 15 vendors of high-end tools had shipped products; add another 22 vendors of PC-based tools that were delivered to customers, and the expert system tools market includes over 35 vendors — with more on the way.

At present, these two sectors do not compete with each other, although there are indications that this may change, as tools developed on large symbolic processors are ported to smaller but increasingly powerful machines, such as Apple Computer, Inc.'s Macintosh and the impending generation of PCs based on 32-bit microprocessors chips.

Buyers of expert system tools tend to be large corporations and government agencies that use them to build expert systems for proprietary, in-house purposes.

According to our recent market research, the heaviest nonacademic users of expert system tools are manufacturing firms and those doing work in defense or other government contracts. Together, these users account for 60% of expert system tool usage.

But interest in expert system tools has been increasing in such realms as banking, insurance and finance as newly competitive companies in these industries look for ways to develop a strategic edge over their rivals.

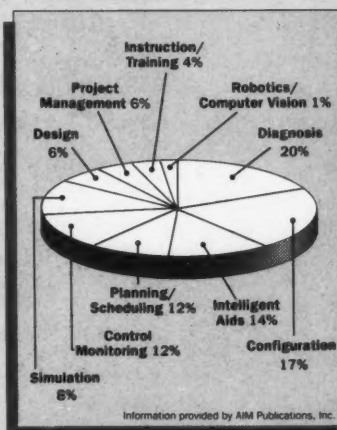
The problem domains in which expert systems have been put to work include the following:

- Diagnosis in computing, telecommunications, electronics, engineering, medicine, resource exploration and military applications.
- Configuration of computer systems, insurance policies and so on.
- Intelligent aids — in tuning

systems, cost determinations.

- Control monitoring — accepting data from sensory inputs — as in process control of manufacturing plants and nuclear power plants.
- Planning/scheduling — in factories, military, finance and so on.
- Simulation — in manufacturing, design, decision support.
- Design — in manufacturing,

### HIGH-END TOOL USAGE BY APPLICATION



software development, very large-scale integration and so on.

- Project management.
  - Instruction and training.
  - Robotics and computer vision.
- Because they have a history of usage among defense contractors and in manufacturing, most tools

”

**MIS accounts for less than 5% of expert system tool purchases, but that is starting to change as their profound potential becomes better understood.**

are used in engineering applications. The MIS departments account for less than 5% of expert system tool purchases, but that, too, is starting to change as the profound potential of expert system tools becomes better understood. Examples of MIS use of

these tools include the following:

- Travelers Insurance Co. of Hartford, Conn., is using Teknowledge, Inc.'s S.I. expert system tool to diagnose faults in DP equipment.
- Level Five Research, Inc. has built an expert system using its own product, Insight 2+, which aids in the planning and scheduling of software development projects.
- In a significant new development in expert system tool architecture, Software Architecture & Engineering, Inc. will soon announce its next-generation project, a specialized expert system tool geared for software development that combines knowledge base and software engineering.

Messenheimer is president of AIM Publications, Inc., a Natick, Mass.-based market research firm specializing in artificial intelligence commercialization that publishes the monthly "AI Markets" newsletter.

**\$445.**

A small price to pay for a full-duplex 2400 bps dial modem from the company preferred by more communications managers than any other.

The Codex 2233 dial modem. Find out about it. Call 1-800-426-1212. Ext. 230.

**codex**

MOTOROLA

Motorola and @ are trademarks of Motorola, Inc. Codex is a registered trademark of Codex Corporation.  
© 1986 Codex Corporation.



## Product Spotlight/Expert System Shells

**Continued from previous page**

bases as well as those with a great number of rules will probably be best developed using a hybrid system — which includes both rules and frames — such as the Knowledge Engineering Environment (KEE) from Intellicorp or the Automated Reasoning Tool (ART) from Inference Corp. "The hybrid shells let you manage rules better. Including frames allows you to write more into the data structure and less into the rules," Carter says.

**Decision support systems** integrate data from diverse sources into a form that top executives can use to make business decisions. Complex data structures, the ability to express relationships and a good user interface are prime considerations. There may also need to be some rule processing ability, allowing the user to handle statements such as, "If this ratio is X, then inventories are too high." Programs such as Exsys from Exsys, Inc. and Guru from Micro Data Base Systems, Inc. fall into this category.

**Decision analysis systems** deal in planning and scheduling. They typically arrange and rearrange large numbers of variables and parameters to come up with a recommended plan or schedule. The shell in which a decision analysis system is built must not limit the number of variables and intermediate variables. A feature known as blackboard architecture, which allows the inference engine to consider a variety of possibilities at once, is useful here. A shell such as ART is especially well suited to decision analysis problems.

**Systems that deal in soft and unstructured input**, such as the Securities and Exchange Commission system (built by Arthur Andersen using the KEE shell) for analyzing corporate annual reports, need some type of natural language processing capabilities as well as the ability to manipulate complex data structures.

**Flexible and maintainable systems**, such as those used by insurance agents to generate client proposals, deal with domains where the rules are changed frequently and the knowledge base must be updated to take every change into account. "Most shells can be applied to this type of problem," Carter says. "Its complexity will determine whether it should be rule-based or hybrid." Teknowledge, Inc.'s S.I. and Aion Corp.'s Aion Development System/PC are among the most suitable shells for this type of application.

There probably is no shell in existence that does not require compromise at some point in the development process. Still, Carter advises, "You'll get a long way into your work before you're smart enough to realize what the limitations of these systems are, and until then you won't be qualified to write your own. . . . With a shell, you can be productive in a matter of days." Then he adds, "But it's like playing chess. You can learn all the moves in a couple of hours, but you don't master it for a long time because it's so rich. It helps to have someone around who knows how to put the moves to use."

### Picking the right development shell

The way they reason, and the fact that they reason at all, make expert

”

**An inventive MIS manager could do worse than to consign his department's expertise in identifying bottlenecks and expert capacity to an expert system.**

systems highly memory intensive. Where personal computers will be either the development or the delivery vehicle, 640K bytes of random-access memory (RAM) and a hard disk should be considered minimum requirements. If budget constraints preclude upgrading memory in existing machines, then considerations other than a package's RAM requirements may be irrelevant.

There are PC-based shells that require as little as 256K bytes of RAM, using additional available memory to conduct rule searches. They can hardly be expected to do serious work in minimally equipped computers.

Budget and memory constraints aside, there are several important considerations that must be weighed when picking any expert system de-

velopment shell:

- The type of knowledge that is involved.
- The type of reasoning that is used.
- I/O requirements at runtime.
- Rule editing and debugging facilities provided.
- Vendor support.

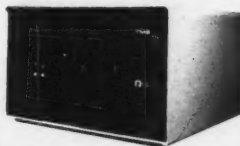
**E**xpertise in a subject area — a domain, in expert system terminology — usually comprises a variety of elements: vocabulary definitions, objects and the relationships between them, constraints, hypotheses, rules, heuristics and descriptions of processes and experience based on situations previously encountered.

Continued on next page

## WHEN YOUR MICRO AND MAINFRAME AREN'T SPEAKING...

... then you need Renex protocol converters. Do what no conversion board can: interface your host with up to 32 devices at one time—at one price. Choose from over 150 async terminals. *That's flexibility.*

**The TMS-one Asynchronous Communications Controller.** The first controller that lets async terminals and PC's communicate as interactive (3270, 3290, and 5250) and batch (3767 and 3770) devices in SNA/SDLC or Bisynch protocols, all simultaneously.

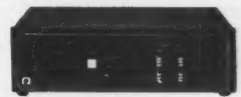


**The RT74 Protocol Converter.** Allows your ASCII terminals, CRTs, printers, and PC's to talk with a host as if it were an IBM 327X or 328X. Timeshare remote 3270 terminals from a single TRANSLATOR; or use with asynchronous modems to transmit data over common carrier lines.



**Small Users.** Single or triple port remote access protocol converters at a price only boards have been able to offer . . . until now.

**The RT51 Protocol Converter.** Adapts ASCII devices or PC's to your IBM System 34/36/38, using SNA/SDLC protocols. Supports 125 types of async terminals, KSR devices, and personal computers.



**The BI-PATH Reverse Protocol Converter.** Allows IBM 3278, 3178, and look-alike terminals to access the ASCII asynchronous world. Access public data bases, service bureaus, packet networks, electronic mail systems, and of course your own in-house system.



**Terminal Emulation Software. R-Link Software** enables IBM PC's and clones to appear as IBM 3278 or 5251 terminals when connected with Renex protocol converters. **RAP Software** transfers data packets quickly, efficiently, and without error in end-to-end transmissions and Public Data Networks.



When your micro and mainframe aren't speaking, we have ways of making them talk. Call Renex today at (703) 494-2200.

### PROTOCOL CONVERSION



Renex  
Corporation

Eastern Region  
(703) 494-2200

1513 Davis Ford Road • Woodbridge, VA 22192  
(703) 494-2200

Western Region  
(714) 380-8456



## Product Spotlight/Expert System Shells

Continued from previous page

This knowledge can be expressed in a variety of ways. Say, for example, that an applicant must show combined costs for housing and installment debt to be less than 32% of total income in order to qualify for a mortgage loan. That rule might be written: If the sum of applicant's housing costs and installment debt payments is less than 32% of total income, then applicant is eligible for a mortgage loan.

This IF-THEN format represents the most common way of expressing knowledge in an expert system. Given the necessary data for a specific applicant, the expert system can look in its rule base and determine the applicant's eligibility.

With sufficient effort, a developer can code a great deal of expert knowledge using shells based on IF-THEN rules, such as M.1 from Teknowledge, Exsys, Insight 2+ from Level Five Research, Inc. and ES/P Advisor from Expert Systems International. Some types of knowledge, however, lend themselves more readily to other representation schemes.

Where examples of successful decisions abound, but the rules behind them remain unclear even to the experts, an inductive system that generates its own rules from examples may be preferable. One method of expressing knowledge in an inductive system is called a decision matrix. It permits a series of attributes to be arranged in spreadsheet form with the right-hand column of the spreadsheet containing the conclusion. For example, attributes contributing to a weather forecast might

include temperature, relative humidity, barometric pressure, direction of pressure change, wind direction and wind speed. Each row of the matrix would contain the instances of each attribute that would lead to a specific forecast.

A program such as 1st-Class from Programs in Motion, Inc. uses the decision matrix format. Other rule-by-example systems include Radian Corp.'s Rulemaster and General Research Corp.'s Timm PC. They use the same kind of algorithm for inducing rules but do not hold their knowledge in a matrix.

The most obvious way to express expert knowledge is to state facts and describe how they are related to each other, usually in a complex data structure called a frame. Shells with this capacity are the most effective method for describing complicated relationships, but systems built around frames are typically more difficult to program and debug.

Frame-based representation schemes are found exclusively in minicomputer-based shells so far, because of the large chunks of memory they require. Some shells, however, known as hybrid systems, accept both rules and frames in the same knowledge base. Wizdom PX from Software Intelligence Laboratory, Inc., for example, solves the problem of describing complex relationships by linking factual statements in a relational network.

Related to the issue of knowledge representation is the question of how and by whom the expert system will

Continued on next page

## Expert system shells at work in commercial environments

**SHELL:** Insight 2+.

**BUILT BY:** Lummus Crest, Inc., Bloomfield, N.J. (subsidiary of Combustion Engineering, Inc., Stamford, Conn.).

**PURPOSE:** Intelligent computer-aided design for in-house use.

**DESCRIPTION:** Lummus Crest uses Planned Design Management System (PDMS), an engineering modeling software system from Great Britain, to design process plants and oil and gas production facilities. The company added complex enhancements to PDMS. One of the added systems, built by design engineer Andre Maziarzewski, makes PDMS easy to use.

The Insight 2+ portion of Maziarzewski's expert system runs on IBM Personal Computer XT and ATs and a Compaq Computer Corp. 286. The PCs use Microsoft, Inc. Crosstalk communications software to talk to a Prime Computer, Inc. 9955 minicomputer and Westward Technology, Inc. 2015 graphics terminals. Operators at the terminals fill in on-screen forms with about 40 variables taken from sketches done in the process department.

The expert system prompts the user for inputs and checks them for validity, commenting in a conversational manner when inputs are outside expected limits. Then it submits the resulting file to a drafting program, analyzing input data to select the drawing scale that will best display design details.

If there is too much demand on the system's resources, slowing response times to unacceptable levels, the system flashes a warning: "Too many users working; getting shorter on memory. I will be slower. Sorry."

**SHELL:** Knowledge Engineering Environment (KEE).

**BUILT BY:** Arthur Andersen & Co., Chicago.

**PURPOSE:** Analysis of corporate financial information, for use by the Securities and Exchange Commission (SEC), Washington, D.C.

**DESCRIPTION:** Federal law requires that all publicly held companies submit reams of financial data to the SEC, which investigates possible violations of the securities laws. An expert system reads corporate proxy statements with a sophistication unmatched by

the average human investor.

Asked to identify companies that have taken action in the past year to dodge a leveraged buy-out attempt, for example, it searches for concepts rather than specific words, the way an investor who knew what to look for would do.

The system runs on Symbolics, Inc. 3600 and Xerox Corp. 1108 machines.

**SHELL:** KEE.

**BUILT BY:** Babcock and Wilcox Co., Lynchburg, Va.

**PURPOSE:** Welding advisory system for use by a construction subsidiary.

**DESCRIPTION:** The Weld Scheduler specifies welding procedures and inspection requirements to be used in on-site construction of coal- and oil-fired boilers.

The system combines the expertise of design and welding engineers. Its output is a set of instructions to welding technicians at the construction site.

Written in KEE on a Symbolics 3670 minicomputer, the Weld Scheduler's user interface is implemented on an IBM Personal Computer located in the Babcock and Wilcox Construction Co.'s office in Copley, Ohio. There users fill out on-line work sheets, providing data for about 30 welds at a time, then submit these sheets by telephone line for batch processing on the parent company's host Symbolics 3670 in Lynchburg.

**SHELL:** Automated Reasoning Tool.

**BUILT BY:** Composition Systems, Inc., Elmsford, N.Y.

**PURPOSE:** Newspaper management, for use by client newspaper companies.

**DESCRIPTION:** Slated to go into beta testing this summer, Composition Systems' Expert Publishing System is designed to take the crisis atmosphere out of daily newspaper operations. The system is composed initially of three separate systems that tie together the functions of advertising, page design and production.

The Expert Space Reservations System manages newspaper space allocations for ads and news, keeping a running inventory for every edition.

In the ad sales office, it also handles order processing functions, gives sales personnel intelligent advice about contract rates and sales opportunities and

contains comprehensive MIS reporting capabilities.

The Expert Paper Layout System performs continuous real-time page design, determining the placement of ads so as not to conflict with news stories, adjusting layouts to handle late-breaking news and last-minute ad cancellations and making complex financial decisions centering on when to increase or decrease the number of pages in an edition. It also configures the presses and mediates between the often conflicting demands of the editorial, advertising and production departments.

The Expert Production Control System tracks the flow of editorial and advertising copy, allocates resources and schedules their use and predicts major demands for people, equipment and supplies to avoid bottlenecks and shortages.

Composition Systems' product runs on any Digital Equipment Corp. VAX/VMS processor. Configurations vary according to newspaper circulation size.

**SHELL:** Insight 2+.

**BUILT BY:** Bruce Olsen, vice-president, Seafirst Bank, Seattle.

**PURPOSE:** For Olsen's own use as a bank credit examiner.

**DESCRIPTION:** Olsen's job involves overseeing the credit quality of the people to whom Seafirst makes loans.

Three separate knowledge bases incorporate bank rules and policies concerning consumer auto leasing installment loans, purchase of new car loans from automobile dealers and the bank's personal revolving line of credit, which may be either unsecured or secured by a homeowner's equity.

Since most consumer credit is granted according to a technique called credit scoring, Olsen incorporated into his system about 10 pages of scoring rules taken from a manual that accompanied the bank's computer software system. The dealer auto loan system also contains internal bank policies and collection code rules, which determine how quickly the bank will respond if an account seems to be falling behind in payments.

The systems run on a Compaq Deskpro 5, a Microsoft Corp. MS-DOS machine compatible with the IBM PC XT.

— MICKEY WILLIAMSON

The Solution.

# Dial-Up 3270

**LineMaster** An intelligent device for dial-in access to your mainframe 3270 B/sync line. **LineMaster** is a communications watchdog, which keeps a line in service until a user dials in.

- For any remote 3271/4/6 line—up to 19.2K baud.
- Compatible with any 3270 B/sync emulator including microcomputers.
- Connects between modem and mainframe.
- Installs in minutes.

**\$795.**

**MF**

MicroFrame, Inc.  
2551 Route 130  
Cranbury, NJ 08512  
(609) 395-7800





## Product Spotlight/Expert System Shells

Continued from previous page  
be developed. Often the task is a team effort, with the person possessing the expert knowledge teaching a programmer about how decisions are made. The programmer assumes the role of knowledge engineer — collecting and coding information and then working with the expert to validate the system by giving it additional problems to solve.

To make both coding and validating easier, the ideal expert system development shell reasons the way the expert does. Reasoning is the job of the inference engine; it is built into the shell.

Some inference engines, termed "forward chaining," look at the left-hand (IF) side of the first rule in the knowledge base and try to determine whether the fact it asserts is true. If the fact is false, the system moves to the next rule and tries to prove the truth of its assertion. When a rule whose left-hand side is true is located, the forward-chaining inference engine declares its right-hand (THEN) side true as well. The rule is said to have been fired, and the inference engine goes on to find another rule whose IF side matches the THEN side of the rule just fired, continuing in this way until no more rules can be fired. The system then reports its conclusion, if one has been found, or announces that it cannot draw any conclusions from the information at hand.

By contrast, the "backward-chaining" inference engine starts with a goal or hypothesis and works backward through the rules in its knowledge base, considering only those that are relevant to the goal. If X is the goal, a backward-chaining system looks for a rule whose THEN part contains X. Having found one, it inspects the IF part of that rule and looks for another rule that has the same terms in its THEN part, continuing until it fires all the rules necessary to prove X true. If it cannot satisfy the requirements for X, it picks another hypothesis and tries again or reports to the user that no conclusion can be reached.

Often a forward-chaining inference engine will have to pass over a rule, because it has not yet been proven true, only to return to it later when its IF clause becomes true. A similar process can occur with backward-chaining engines. This does not mean they chain in both directions; which side of the rule is considered first determines the direction of chaining.

Generally, a backward-chaining system runs faster

for problems where the user seeks to select from a list of possible outcomes — as in

diagnosing an illness or mechanical fault given both a set of symptoms and an edu-

cated guess as to where the fault lies. Forward-chaining systems perform more effi-

”

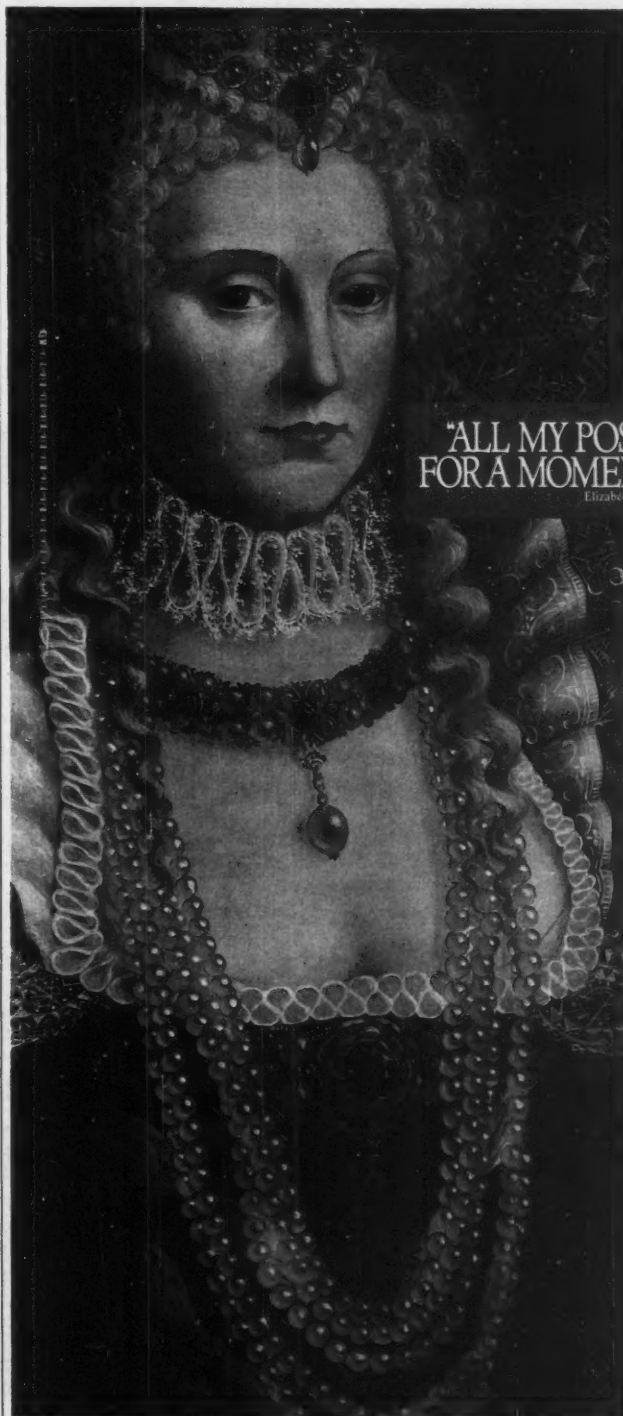
*'With a shell, you can be productive in a matter of days. It's like playing chess. You can learn all the moves in a couple of hours, but you don't master it for a long time because it's so rich.'*

— Joseph Carter  
Arthur Andersen & Co.

ciently where a body of data must first be assembled to perform a task — as in configuring a computer system or selecting the best candidate to fill a hiring requisition given a set of performance or qualification criteria.

If an inference engine considers its job done when it finds a single valid conclusion, then the order of chaining may have a significant

Continued on next page



**"ALL MY POSSESSIONS  
FOR A MOMENT OF TIME"**

Elizabeth I



The ITT XTRA XP desktop personal computer

### You can't buy time.

Long before Queen Elizabeth I, man began his quest to hoard that most precious and elusive of commodities: Time.

He can only make better use of the few hours he already has.

Hence, the development of today's business computer.

### The ITT XTRA™ XP. Our crowning achievement.

By matching memory to the muscle of the Intel 80286 microprocessor, we're able to achieve "no wait states."

Processing never pauses for slower memory.

Making the ITT XTRA XP thirty percent faster than the IBM AT. And fully XT-compatible.

Giving you speed and flexibility. Because, being a corporation of many businesses, we're in a unique position to better understand what you need to grow.

Today, as well as tomorrow.

	ITT XTRA XP	COMPAQ 286	IBM PC/AT
Lotus 1-2-3	11sec	13sec	15sec
dBase	36sec	52sec	56sec
FormSort	52sec	1min 5sec	1min 10sec

All comparisons are for purposes of illustration only. User's application performance is dependent on application.

**A moment's investment today  
can pay off royally tomorrow.**

Call (800) 321-7661. In California,  
(800) 368-7300.

And call quickly. Every moment wasted is a potentially profitable moment you'll never possess again.

**ITT**  
PERSONAL COMPUTERS

**BECAUSE TIME IS THE  
ULTIMATE BOTTOM LINE.**

© 1986, ITT Information Systems. IBM, PC/AT and PC/XT are registered trademarks of International Business Machines. Intel 80286 is a registered trademark of Intel Corporation. Compaq 286 is a registered trademark of Compaq Computer Corporation. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. dBase is a registered trademark of Ashton-Tate.



## Product Spotlight/Expert System Shells

Continued from previous page

effect on the expert system's advice. The direction of chaining is not always important, however. Richard Currie, systems development specialist in the research and development division of Babcock and Wilcox Co., an operating unit of McDermott International, Inc. located in Lynchburg, Va., found that the expert system he built using KEE performed identically when it chained in either direction.

"We chose KEE because it had both forward and backward chaining," Currie says. "We tried it both ways and didn't see any difference in performance, so we went with forward chaining, which seemed more natural to the operators."

Some shells allow either the developer or the user to determine the direction of the search. Moreover, some also permit the developer to determine the order in which rules will be considered by assigning priorities to them or by putting them into categories whose consideration is triggered by specific events. Certainty factors can be associated with rules that are in the knowledge base. Where statistical probabilities enter into an expert's decision making, a shell's certainty factor capabilities become important. For example, if Premise A leads to Conclusion B 75% of the time and to Conclusion C 60% of the time, then the shell should be able to contain that information.

It may also be necessary to allow the user to express confidence in the variables input at runtime. The user may be only 60% sure that Condition A exists. Numerous ways exist to combine the certainty factor of the knowledge base with the certainty factor of the user. Some methods yield more conservative results than others, but few shells offer more than one system for calculating certainties. One of the most sophisticated systems in this respect is Guru, a personal computer-based shell that runs under Unix and Microsoft Corp. MS-DOS.

Some expert reasoning involves pieces of data which, in expert system terminology, are called "fuzzy variables." It may be necessary to allow a user to answer a question at runtime with a list of possibilities, perhaps associating a different certainty factor with each. An inference engine that can handle fuzzy variables combines each of these variables with the applicable rules and comes up with a list of possible outcomes, each with its associated indication of probability.

The ability to select a threshold of certainty — to tell the inference engine, in effect, not to consider any outcome that has less than a certain percentage of certainty — is another desirable characteristic for many applications. Setting a high threshold can speed processing where only the most likely outcomes are useful. Some systems arbitrarily set the confidence threshold at 20%, causing rules to be considered and results to be reported that are too uncertain to be of any use.

Expert systems vary widely in their I/O requirements. Input needs may be as simple as plucking data from a Lotus Development Corp. 1-2-3 spreadsheet or as complex as reading data from a bank of

process monitoring instruments. Advice may be required in real time or not; printing results on a terminal screen may be good enough, or written reports — with or without graphics — may be required. It may be necessary to store user inputs in a disk file along with the system's recommendations. Matching a system's requirements to a shell's abilities may mean setting priorities — or it may mean insisting on a shell that can reach out to the operating system to run programs written in other languages.

"Despite all the hype, you're not going to do a useful application without actually writing some code outside the shell," says Currie of Babcock and Wilcox. "So you'd better have a shell that permits you to get in and out easily."

Programming the user interface can be especially important when the end users are not the same people as the experts whose knowledge the system contains. People can resist the introduction of expert systems for a variety of reasons. Some, such as fears about job security, are issues for management to handle. Others, such as ease of use and confidence in the system's abilities, must be dealt with during development.

John Kruse, senior software engineer at 3M Corp.'s software and electronic resource center in St. Paul, Minn., developed an expert system that helps chemists predict the physical properties of polymers they have synthesized.

Kruse says user patience can be strained if the expert system has to search a huge space to find its an-

swers, but even slow processing speeds need not present a barrier to user acceptance.

"A human factors tactic is to make the system helpful enough so that the user knows when there's going to be a long wait," he says. "Nobody minds going for a cup of coffee while some work is being done for him." Users, Kruse adds, want "predictability and controllability of the system. If you do your human factors correctly, it should not be a problem."

Rule editing and debugging facilities are important considerations both for user acceptance and for ease of development. During the validation process, the experts whose knowledge is built into an

# New Fro

## 40 Megabyte Capacity, BACKUP™ Tape System.

Irwin has raised tape backup to a capacity of 40 megabytes. And, just as with Irwin's 10 and 20 megabyte systems, the micro cartridge is so small, it fits easily in a shirt pocket. This new 40 megabyte system provides all of the features and advantages that have made Irwin BACKUP™ Tape Systems the best selling in the microcomputer industry. *Here's why!*

**Irwin's Complete and Friendly Software** makes backup convenient and easy to use. Menu driven, Irwin software permits unattended backup of your entire disk or only specific files you select.

### Interchangeability is Assured

by Irwin's patented SERVO™ track following feature. Your Irwin Micro Cartridge can be accurately read on any computer equipped with an Irwin BACKUP™ Tape System.

### Irwin's EC TAPE™

provides automatic error correction. This eliminates the need for verification and assures you of data integrity.

### Extremely Affordable.

less than \$1,000\*, the Irwin 40 megabyte BACKUP™ System more than pays for itself the first time it is used to restore data.

### Designed Specifically to protect

information stored in microcomputers equipped with hard disks, each Irwin 10, 20 and now 40 megabyte system includes models for internal mounting drive or external plug-in. Irwin BACKUP™ Systems are designed for IBM PC, XT and most popular compatibles.

Now there's 40 megabyte protection that is easy to use and affordable. Why take unnecessary risks? Call 1-800-BACKUP 1 or visit a leading computer store for a hands-on demonstration.

**IRWIN**

One Shamrock, Box 700  
St. Paul, MN 55101  
(612) 291-1111



## Product Spotlight/Expert System Shells

expert system need to look at the rules to trace their logic. If the rules are impossible for a nonprogrammer to read, debugging and validating the system are more difficult than they should be.

In Seattle, Seafirst Bank Vice-President Bruce Olsen — whose bank-credit expert system incorporates knowledge from books, manuals and bank policy statements — says the ability to ask a system how it reached its conclusion is a real asset. Usually, he notes, when an expert system exhibits faulty logic, it does so because it is lacking some key piece of information. To illustrate, he tells this story:

"I tried to plug our chairman of the board into my personal lines of credit evaluator. Since he leases a condominium — he doesn't own a

house up here — the thing blew up and denied him any credit. I had to reason backward to find out where the problem occurred. It turned out I was missing a key rule."

Olsen says he would have spotted the problem faster if he had been more experienced in building expert systems and adds, "It sure was frustrating at the time. Asking how the

system got there would have been darn nice."

In some cases, a development shell's features can be less important than the nature of the company that supplies it. According to Thomas Freund, project leader in the manufacturing analysis group at Pratt

**"Make the system helpful enough so that the user knows when there's going to be a long wait. Nobody minds going for a cup of coffee while some work is being done for him."**

— John Kruse  
3M Corp.

and Whitney — a division of United Technologies Corp. — based in East Hartford, Conn., "If you are looking strictly at the kind of knowledge representation and so forth, you are going along a blind alley," he says. "It's important also to look at the company — at the direction in which they are heading, what kind of market they are targeting, what kind of applications."

Freund says his organization chose Carnegie Group, Inc.'s Knowledge Craft for its intelligent computer-aided design system because Carnegie is "heavily into manufacturing and engineering. People should look more at what a company is doing in their own area, rather than the fact that they sell this wonderful shell."

It is also important to Freund that the Carnegie Group maintains a consulting practice. "There has to be a value to having that consulting capability when you need it and to the fact that they are coming up with products geared to the kind of application you have in mind," he adds.


Some form of knowledge base security may be important in an expert system to protect the knowledge base from inadvertent corruption. Shells that offer a runtime version provide one form of security. In instances where it is desirable to keep users from inspecting the knowledge base at all — where proprietary information is incorporated into a novice training program, for example — tokenization or compilation is required. And compilation is a necessity where execution speeds are to be considered. "Running a shell interpretively and expecting to get any performance out of it is ludicrous," says Composition Systems' Stock.

It would be reasonable to wonder why a computer shop staffed with competent programmers should use an expert system shell instead of writing code from scratch. The answer comes in two parts. First, programmers tend to think in terms of procedures rather than in terms of problems, which is the way expert system development demands. Second, with their built-in knowledge representation schemes and inference engines, shells have done the less creative part of the work, leaving the developer free to concentrate on finding the best way to express the expert knowledge and develop the best possible user interface.

"An expert system shell works in much the same way as a problem-oriented fourth-generation language," Olsen observes. "A person who cut his eyeteeth on procedure-oriented programming can find making the transition a bit of a hurdle, but the training in logical thought is definitely a help."

The inferencing and knowledge representation techniques of expert system development had their origins in the artificial intelligence laboratories of the major universities, but the day is at hand when they will be taken for granted as a basic part of computer software technology — as unexceptional as a spreadsheet. When that day comes, if the expert system developers are not housed in the DP shop, then they will be spread throughout the corporation — and they will surely be looking to the computer room for access to data bases and for technical aid and comfort.

# mlrwin!





# The single best way to turn your PC-AT into a multi-user system.



## Introducing the Wyse WY-60.

Now there's a perfectly compatible, reliable, economical, Wyse way to get multi-user mileage from your PC-AT. Wyse WY-60 terminals give you complete compatibility for your IBM Personal Computer AT systems, right down to the exact keyboard layout, character set and display features.

The only thing different is how much cleaner and more readable your information is with the WY-60's high resolution and flat, non-glare, 14" tilt/swivel screen.

Multiple display formats go up to 132 columns and 44 lines on one screen, to get the most out of applications such as Multiplan and WordStar.

And a 512-character downloadable soft font is also there when you need mathematical symbols or customized character sets.

The adjustable arm is optional, and you can choose a green, white or amber screen.

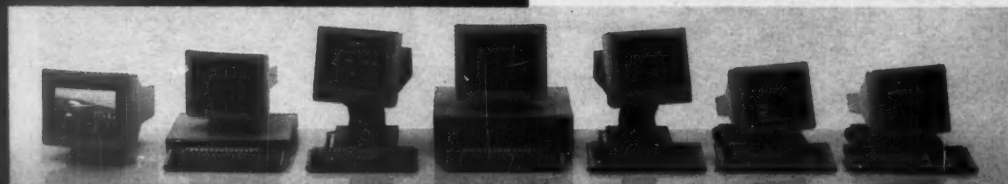
No wonder we ship more terminals than anybody but IBM.\*

Call toll-free or write, today, for more information. Wyse Technology, Attn: Marcom Department 60-AT, 3571 N. First St., San Jose, California 95134.

Call 1-800-GET-WYSE

# WYSE

YOU NEVER REGRET A WYSE DECISION.

Wyse is a registered trademark of Wyse Technology. WY-60 and the "W" shaped design are trademarks of Wyse Technology. IBM and IBM Personal Computer AT are trademarks of International Business Machines Corporation. WordStar is a registered trademark of MicroPro International. Multiplan is a registered trademark of Microsoft Corporation. © 1988 Wyse Technology. \*Estimate 1988 personal shipment update.



## Product Spotlight/Expert System Shells

## EXPERT SYSTEM DEVELOPMENT SHELLS

Vendor	Product	System Requirements		Knowledge Reasoning							Runtime Version Available	Runs in Compiled Form	Performs Higher Math Computations	Runs External Programs	Text Editor	Data Import	Price
		Minimum Memory Required (in bytes)	Requires Hard Disk	Rule-Based	Frame-Based	Example-Based	Forward Chaining	Backward Chaining									
Alon Corp. 101 University Ave. Palo Alto, Calif. 94303	ADS/PC	512K	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Lotus 1-2-3, Ashton-Tate Dbase II, Dbase III, Microrim R:Base	\$7,500	
Arity Corp. 358 Baker Ave. Concord, Mass. 01742	Arity/Expert	512K	No	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	No	ASCII, Dbase II, 1-2-3, Lotus Symphony	\$295		
Artelligence, Inc. Suites 212-253 14902 Preston Road Dallas, Texas 75240	Prodigy	256K	No	Yes	No	No	No	Yes	Yes	No	No	Yes	No	ASCII	\$450		
Automated Reasoning Corp. Suite 1D 290 W. 12th St. New York, N.Y. 10014	In-Ate	512K	No	Yes	Yes	Yes	Not applicable	Not applicable	Yes	Yes	Yes	Yes	No	LISP, ASCII	\$5,000		
Automated Reasoning	In-Ate*	Not applicable	Not applicable	Yes	Yes	Yes	Not applicable	Not applicable	Yes	Yes	Yes	Yes	No	LISP, ASCII	\$15,000		
California Intelligence #8, 912 Powell St. San Francisco, Calif. 94108	Xsys	640K	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	ASCII, IBM Data Interchange Format (DIF), Microsoft Syk, 1-2-3, Dbase II, Dbase III	\$995		
Carnegie Group, Inc. Suite 650 Commerce Court Station Sq. Pittsburgh, Pa. 15219	Knowledge Craft*	Not applicable	Not applicable	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	ASCII	\$50,000		
Expert Systems International 1150 First Ave. King of Prussia, Pa. 19406	ES/P Advisor	384K	No	Yes	No	No	No	Yes	Yes	Yes	No	No	No	ASCII	\$895		
Exsys, Inc. P.O. Box 75158 Contract Station 14 Albuquerque, N.M. 87194	Exsys	256K	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	ASCII	\$900		
General Research Corp. 7655 Old Springhouse Road McLean, Va. 22102	Timm-PC	640K	Yes	No	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Can be imbedded in other programs	\$5,000		
Human Edge Software 1875 S. Grant St. San Mateo, Calif. 94402	Expert Edge	256K	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	ASCII, DIF, 1-2-3, Dbase II, Dbase III	\$795		
Inference Corp. #501 5300 W. Century Blvd. Los Angeles, Calif. 90045	Automated Reasoning Tool*	Not applicable	Not applicable	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	LISP	\$65,000		
Intelliparc 707 Laurel St. Menlo Park, Calif. 94025	Knowledge Engineering Environment*	Not applicable	Not applicable	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	LISP	\$55,000		
Intelligenceware, Inc. Suite 730 9800 S. Sepulveda Blvd. Los Angeles, Calif. 90045	Expertech	256K	No	Yes	No	No	Yes	Yes	Yes	No	No	Yes	No	ASCII, Dbase II, Dbase III	\$475		
Intelligenceware	Intelligence/Compiler	300K	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	ASCII	\$990		
KDS Corp. 934 Hunter Road Wilmette, Ill. 90091	KDS Development System	512K	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	ASCII, DIF, Syk, 1-2-3, Dbase II, Dbase III	\$945 to \$970		
Level Five Research, Inc. 503 5th Ave. Indianatic, Fla. 32903	Insight 2+	192K	No, but recommended	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	ASCII, DIF, 1-2-3, Dbase II, Dbase III	\$485		

The companies included in this chart responded to a recent telephone survey conducted by Computerworld. Vendor list supplied by the Qwerty Group of Warwick, Mass. Further product information is available from the vendors.

\*These shells are for use in minicomputer environments.

CW chart compiled by Michael Sullivan-Trencia and Christine Seant



## Product Spotlight/Expert System Shells

Vendor	Product	System Requirements		Knowledge Reasoning							Runs in Compiled Form	Performs Higher Math Computations	Runs External Programs	Text Editor	Data Import	Price
		Minimum Memory Required (in bytes)	Requires Hard Disk	Rule-Based	Frame-Based	Example-Based	Forward Chaining	Backward Chaining	Runtime Version Available							
Micro Data Base Systems P.O. Box 248 Lafayette, Ind. 47902	Guru	512K	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	ASCII, DIF, Syk, 1-2-3, Dbase II, Dbase III	\$2,995
Mountain View Press P.O. Box 4656 Mountain View, Calif. 94040	Expert-2	64K	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes, with addition	Yes	Yes	Yes	DIF	\$100
Portable Software, Inc. 650 Blair Island Road Redwood City, Calif. 94063	XI	512K	No	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	1-2-3, Dbase II	\$1,250
Programs in Motion, Inc. 10 Sycamore Road Weyland, Mass. 01778	1st-Class	256K	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	ASCII, 1-2-3, Dbase II, Dbase III	\$495
Radian Corp. P.O. Box 9948 8501 Mo-Pac Blvd. Austin, Texas 78766	Rulemaster	500K	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	ASCII	\$995
Software Architecture and Engineering, Inc. 1500 Wilson Blvd. Arlington, Va. 22209	NES	640K	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	C	\$4,000
Software Architecture and Engineering	NES*	Not applicable	Not applicable	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	C	\$7,000 to \$25,000
Software Intelligence Laboratory, Inc. 1593 Locust Ave. Bohemia, N.Y. 11716	Wisdom PX	512K	No, but recommended	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1-2-3, ASCII	\$13,000
Systems Designers Software Suite 407 444 Washington St. Woburn, Mass. 01801	Sage	256K	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	Pascal	\$499
Systems Designers Software	Invisage*	Not applicable	Not applicable	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	1-2-3, ASCII	\$15,000 to \$25,000
Teknowledge, Inc. 525 University Ave. Palo Alto, Calif. 94301	M.1	384K	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	C	\$5,000
Teknowledge	S.1*	Not applicable	Not applicable	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	C	\$40,000
Texas Instruments, Inc. P.O. Box 809063 Dallas, Texas 75380	Personal Consultant	640K	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	LISP, Dbase II, Dbase III, 1-2-3	\$950
Texas Instruments	Personal Consultant Plus	640K	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	LISP, DOS, Fortran	\$2,950
Texpert Systems, Inc. 12507 Astee Houston, Texas 77065	Class	192K	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	C		\$395
Texpert Systems	Class*	Not applicable	Not applicable	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	C		\$2,500



**SIT BACK, RELAX,  
AND GET DOWN  
TO WORK.**



Go ahead. Put your feet up, tilt your chair back, and pull out the latest issue of **COMPUTERWORLD**. No one will mind. Because you're doing your job! **COMPUTERWORLD** is mandatory reading for MIS/DP professionals. Indispensable.

51 weekly issues, plus **COMPUTERWORLD FOCUS**, for just \$44. And, receive our Desktop Solar Calculator — **FREE** — with your paid subscription.

**COMPUTERWORLD**

Keeping Up With Today.

Anticipating Tomorrow.





**YES . . . I'll take COMPUTERWORLD — one full year (51 weekly issues) for just \$44. And I'll receive my Desk Top Solar Calculator FREE with my paid subscription. (Allow 6-8 weeks for shipment of your calculator.)**

- [illegible]

FIRST NAME	M I	LAST NAME

TITLE									
COMPANY									
ADDRESS									
CITY							STATE	ZIP	

Canada, Central & South America \$110/ Europe \$165/ All other countries \$245 (Airmail)  
Foreign orders must be prepaid in U.S. dollars.

# COMPUTERWORLD

Detach here, place in envelope, and seal securely

1. BUSINESS/INDUSTRY (Circle one)

1. BUSINESS/INDUSTRY (Circle one)  
 10. Manufacturer (other than computer)  
 20. Finance/Insurance/Real Estate  
 30. Medicine/Law/Education  
 40. Wholesale/Retail Trade  
 50. Business Service (except DP)  
 60. Government - State/Federal/Local  
 65. Public Utility Communications  
     Systems/Transportation  
 70. Mining/Construction/Petroleum/  
     Refining/Agriculture  
 80. Manufacturer of Computers  
     Computer-Related Systems or Peripherals  
 85. Computer Service/Bureau  
     Software/Planning/Consulting  
 90. Computer Peripheral Dealer/Distributor/Retailer  
 75. User Other \_\_\_\_\_  
 95. Vendor Other \_\_\_\_\_

2. OCCUPATION/FUNCTION (Circle one)

11. President/Owner/Partner/General Manager
12. VP Assistant VP
13. Treasurer/Controller/Financial Officer
21. Director/Manager/Supervisor DP/MS Services
22. Director/Manager of Operations/Planning/Admin. Serv.
23. Systems Manager/Systems Analyst
31. Manager/Supervisor Programming
32. Programmer/Methods Analyst
33. OA/WP Director/Manager/Supervisor
34. Data Comm. Network/Systems Mgmt
41. Engineering/Scientific R&D/Technical Mgmt
51. Manufacturing Sales Reps/Sales Marketing Mgmt
60. Consulting Management
70. Medical/Legal/Accounting/Mgmt
80. Educator/Journalist/Librarian/Student
90. Other

3. **COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor or consultant
- A. Mainframes/Superminis
  - B. Minicomputers/Small Business Computers
  - C. Microcomputers/Desktops
  - D. Communications Systems
  - E. Office Automation Systems



## In Depth

# Review your annual reviews

## How objectively do you evaluate your personnel?

By JOHN CLARKE

*Many DP managers look forward to personnel evaluations about as much as visits to the dentist. The author offers a painless cure: a matrix of performance standards for fair, well-structured reviews.*

**N**ot too long ago, the senior management of a growing, service-oriented data processing department faced a dilemma. The department staff had recently grown, and the established methods of managing human resources clearly were no longer effective.

For the past several years, as the number of users and the size of the department grew, true seat-of-the-pants management worked, as it had since the days of the earliest mainframe. However, a sense of formal structure had recently started to evolve. Many functional groups within DP were becoming internally organized along product lines, with programming and analyst staff permanently assigned to certain users or systems.

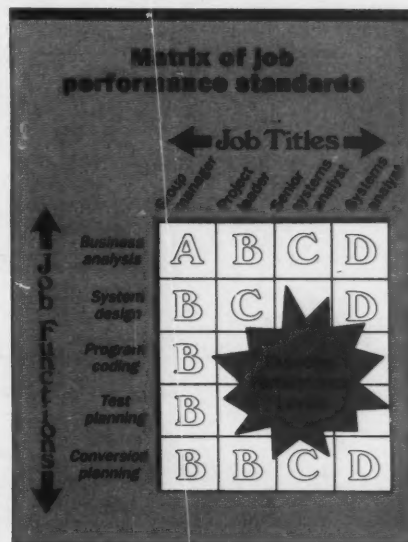
As these groups grew, it became impossible for one manager to administer all department activities adequately. The result was the creation of a new layer of management at the functional group level, charged not only with total responsibility for a user's systems but also with supervisory responsibilities for the group.

The senior managers understandably were concerned that with more people performing supervisory tasks, personnel managers needed to be as objective and uniform as possible. In the past, all personnel performance evaluations were made by one senior manager. But that was to change; in the future more managers would conduct employee reviews. A method was needed to make sure that reviews were evenhanded and meaningful, regardless of the author.

However, the complexity of the task of implementing such a program soon became apparent. Developing an evaluation review form for one work group — in this case, the analysts — led to questions about what was appropriate to measure and how to express the measurements.

Next came questions on what was expected of different groups of analysts who performed different types of tasks and thus required different levels of skill in doing those tasks. When checking the files for specific job descriptions, the discovery was made that no such descriptions existed — previously there had never been time, much less the need, to write them.

Consequently, a potentially dangerous situation existed. Jobs were performed but never formally defined. Tasks were accomplished by a range of employees, but the level of competence at which each individual was expected to perform them was never determined. And out of this environ-



Establishing the levels of skill required, with A designating the most skillful, for each job function can help standardize performance expectations for a specific job title.

ment, objective personnel evaluations affecting promotions and salary increases were to take place.

What solved the organization's dilemma was the use of a structured process for specifying what was required of each job position and the levels of competence needed to fulfill the requirements. Once that process was implemented, a uniform system for evaluating actual performance — based upon the attainment of those standards — was put into effect. The result was an environment in which people knew what was expected of them, what it would take to advance up the organizational ladder and how each person's job performance ultimately would be evaluated.

### Performance evaluation then and now

Many organizations fall into an all-too-familiar trap — rewarding or promoting an employee from one position to another solely because that person has been in a position for a predefined period of time. Rather than promoting or granting salary increases based strictly on longevity, it is better to reward the employee who can successfully perform specific job functions at a required level and demonstrates the necessary skills.

For this to take place, definite standards of required job function ability and skill

**About the author**  
 Clarke is a senior consultant with Positive Support Review, Inc., a management consulting firm based in Los Angeles.



## In Depth/Review Your Annual Reviews

"

***Rather than promoting or granting salary increases based strictly on longevity, it is better to reward the employee who can successfully perform specific job functions at a required level and demonstrates the necessary skills.***

must be developed and directly related to each job position. Following this, a process to formally evaluate employee performance can be implemented.

However, developing a description of what is needed to perform a given job adequately — along with a vehicle to determine if an individual demonstrates the ability to be successful at the job — usually gets deferred until it is too late to avoid confusion and problems. Too

often the perceived complexity of the tasks needed to develop these tools makes it preferable to avoid doing them at all.

The easy solution historically has been to take a short-term perspective. This usually calls for dealing with personnel matters as rapidly and simply as possible and hoping there won't be any complaints. That approach works for a while. But as organizations grow, the short-term view quickly out-

lives its usefulness.

Obviously, time and resources must be devoted to developing a structured system of performance evaluation based upon job and skill requirements. Ultimately, however, the benefits of such a system far outweigh the costs of time and effort that go into the task. The key is in approaching the task one step at a time and in properly identifying and addressing what is necessary to do a job successfully.

#### The elements of performance

Three elements define a job and the performance of that job: functions, skills and objectives. The first two elements are indispensable to defining job requirements and evaluating performance, because they describe what is done and the level of ability needed to do it successfully.

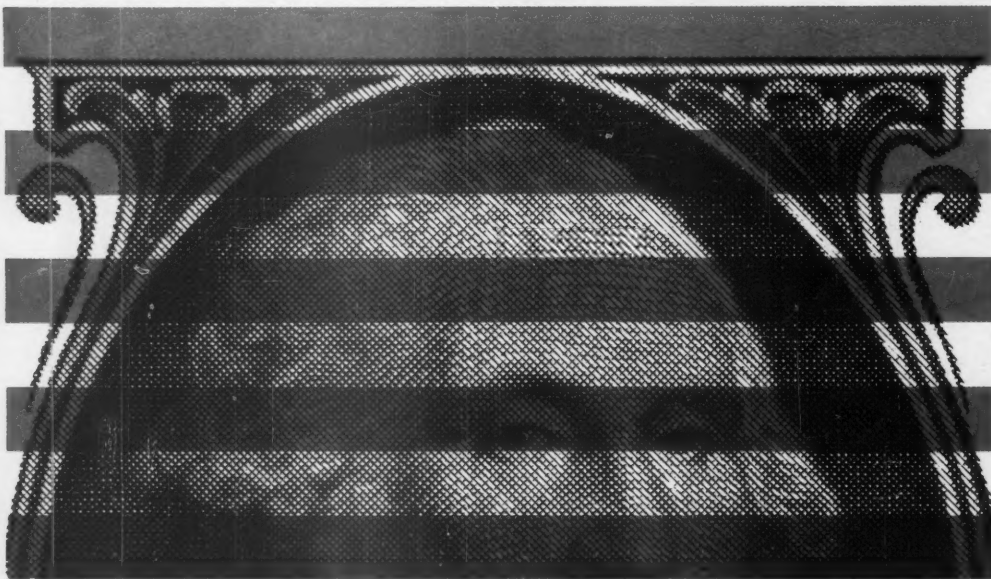
The third element — operational objectives — is an optional part of the process. Operational objectives usually involve managing the activities of others and thus are not appropriate for all employees. However, even when organizations do not establish formal operational objectives, the attainment of objectives is inherent in any measurement system where the employee being evaluated knows the areas in which the measures will be taken. Nevertheless, the use of specific operational objectives forms a valuable third measurement for those organizations that choose to use it.

The process described hereafter focuses on using the major elements — job functions and job skills — to develop individual performance standards and to assess the attainment of those standards in DP organizations.

#### Evaluation tools

Taking the two major elements and transforming them into sets of job descriptions, functional and skill requirement definitions and performance evaluations is a straightforward process — but one that is potentially time consuming for the uninitiated. Fortunately, one can take advantage of several tools for identifying and organizing the information needed to implement meaningful human resource management in a DP organization. These tools are job matrices, narratives that explain the different levels of job functions or skills and a common scale for use in evaluating actual performance.

**Job matrices** show the performance and skill levels that must be maintained across various jobs in a department. In terms of performance evaluation, job matrices allow employees to know what is expected of them in the categories under which they will be evaluated. As a



# PRINT MONEY.

**By replacing your IBM 3287 printer with a Datasouth.**

Unfortunately, you can't actually print money. But with Datasouth high performance dot matrix printers, you can sure save it! Take a look at the chart below, and you'll see that

instead of printing money, you might be burning it.

The CX 3180 and CX 3220 are true co-axial printers that are direct replacements for the IBM 3287. They

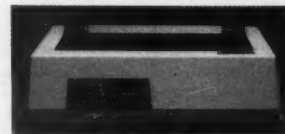
attach to 3274/76 cluster controllers or 4331 Display Printer Adapters without external protocol conversion devices. Both printers do compressed and expanded print. And

both have a Centronics-type parallel interface for PC output.

The CX 3180 is a 180 cps workhorse designed for a 100% duty cycle. The CX 3220 is a multimode printer that prints near-letter-quality text at 45 cps, as well as DP output at 220 cps. It also does high-resolution dot-addressable graphics.

Okay. Now you know that Datasouth printers work better and cost less. And if that doesn't exactly give you a license to print money, it will still do wonders for your budget.

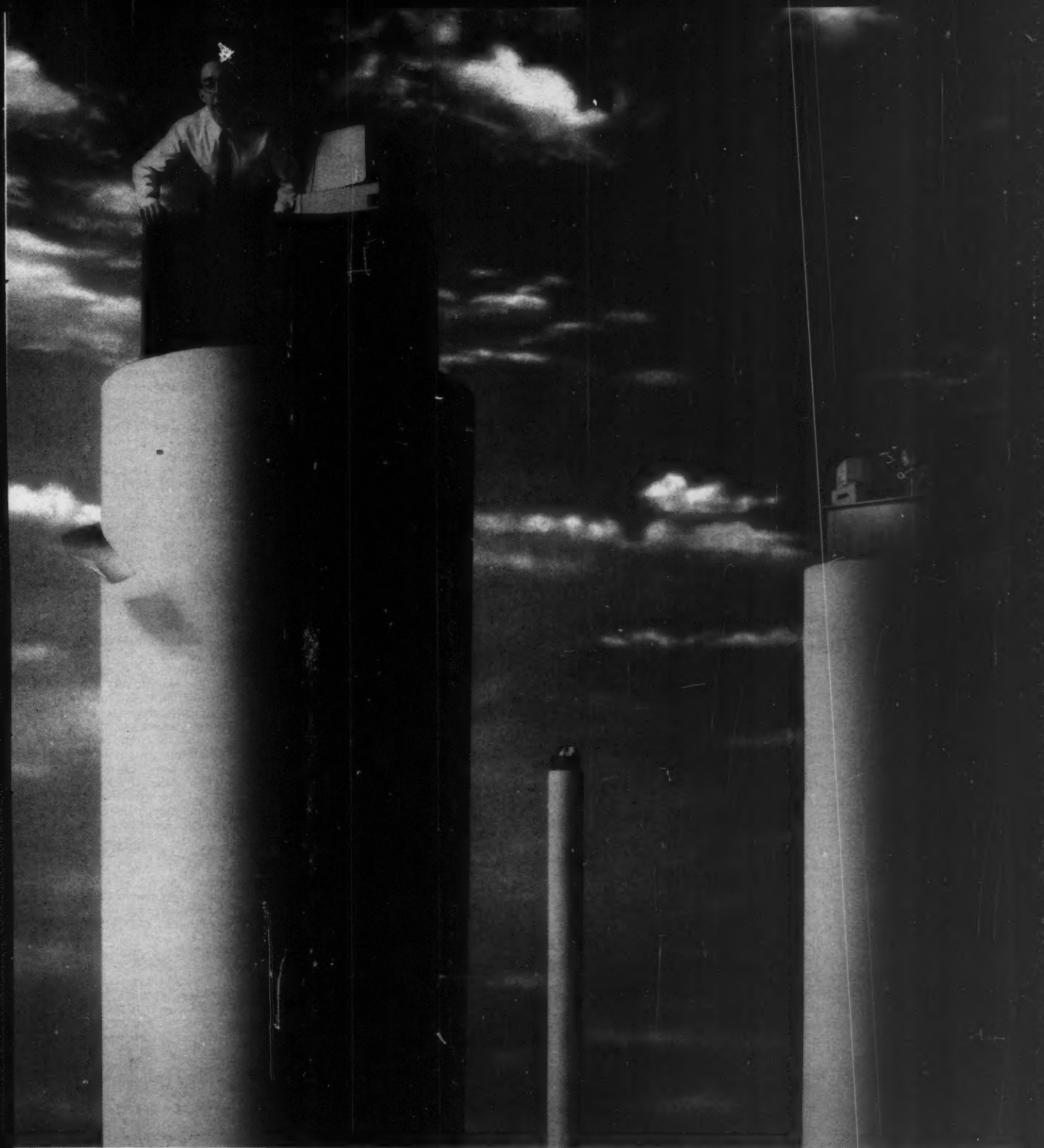
To find your nearest Datasouth distributor, call us at 1-800-222-4528.



**Datasouth**  
AMERICA'S HIGH PERFORMANCE  
PRINTER COMPANY







## WITH DATA GENERAL, YOUR STAND-ALONE PC'S NO LONGER HAVE TO STAND ALONE.


### NOW CEO FULLY INTEGRATES YOUR EXISTING OFFICE SYSTEMS.

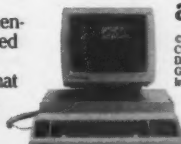
No matter how close your PC's may be, IBM® doesn't seem close to giving you a true integration solution.

CEO Write™ word processing now operates on IBM PC's and compatible intelligent workstations, like the DASHER/One.™ And CEO Connection™ gives them the flexibility to move between stand-alone applications and full office automation. With a single keystroke.

The Data General MV/2000DC™ computer is the new price/performance leader in departmental systems. Which lets you automate each department at a surprisingly low cost.

The latest enhancements to CEO® (comprehensive electronic office) give you complete integrated business automation. From desk to desk. From department to department. From the company that keeps you a generation ahead. To find out more, call 1-800-DATAGEN. Or write Data General, 4400 Computer Drive, Westboro, MA. 01580.

 **Data General**  
a Generation ahead.

© 1986, Data General Corporation, Westboro MA.  
CEO is a registered trademark and MV/2000DC, CEO Write,  
DASHER/One and CEO Connection are trademarks of Data  
General Corporation. IBM is a registered trademark of  
International Business Machines Corporation.



## In Depth/Review Your Annual Reviews

"

*Developing a description of what is needed to perform a given job adequately usually gets deferred until it is too late to avoid confusion and problems. Too often the perceived complexity of the tasks needed to develop these tools makes it preferable to avoid doing them at all.*

tool for planning career development, matrices show how performance and skills must be increased in order to permit progression from one job to another.

Narratives explain what the different levels of performance mean, using quantifiable terms that are relevant to a particular organization.

A common rating scale is used to evaluate actual performance. Such a common scale establishes uniformity

in the evaluation process. Performance is rated relative to whether the standards for the position have been met and thus eliminates much of the subjectivity found in many rating systems.

How these tools fit into the step-by-step development of requirements definitions, job descriptions and performance evaluations is discussed below (see chart page 66).

**Step 1: Identify what is done.** The first step of the

process is to list the job functions performed as a normal part of business by a given group of personnel. Taking applications analysts as an example, the tasks that are part of the system development life cycle form the core of these functions. In most organizations, however, analysts perform functions beyond purely development-related tasks. Obviously, maintenance of ongoing systems is also a major responsibility, but what other functions do members of the group perform?

Lead analysts may get involved in management tasks, and most certainly all analysts perform at least some administrative tasks. What is important at this point is to identify the whole spectrum of functions performed by anyone or everyone in the group. It is not necessary that every individual perform every function on the list, but every major job function should be identified.

**Step 2: Identify the skills needed to do the job.** Most job skills in a DP organization fall into two broad categories: technical skills and people skills.

Identifying the technical skills is a relatively straightforward process, since the list is primarily an inventory of the technologies in use. Again, as with the inventory of job functions, it is not necessary that all individuals be involved in activities that utilize all the technologies.

For example, many firms use both batch and on-line applications as a part of business. More often than not, batch Cobol analysts focus exclusively on maintaining and enhancing these systems, while analysts working with CICS or other on-line technology applications concentrate on their areas of expertise.

Other areas not to overlook when compiling this inventory, even though they may just be coming into the organization, include fourth-generation tools, such as Information Builders, Inc.'s Focus, and microcomputer technologies.

People skills are necessary in any environment other than one in which the only contact employees have with one another is via notes shoved under closed office doors. (Even that requires a certain degree of written communication skill.)

As more and more DP organizations become actively involved in helping users implement information systems technology for competitive advantage, rather than merely for payroll and the general ledger, interpersonal and communication skills become increasingly important. Consequently, the people skills — and business skills — that the organization needs to get the job done

## OUR NEW 12-PAGE LASER PRINTER IS MISSING ONE VERY EXPENSIVE FEATURE. THE MAINTENANCE MAN.

Our clamshell design with modular components makes operator-maintenance easy. And our exclusive change-it-yourself fusing station eliminates a major overhaul or total printer replacement. So you can maintain it right in the office, and keep right on printing. While you keep out the maintenance man.

High performance features keep the Personal Laser Printer a step ahead of your workload. Its compact size fits your desk and your personal printing needs perfectly. It prints up to 12 pages per minute with outstanding resolution (300 dpi) for both text and graphics. It emulates the H-P Laserjet, H-P Laserjet Plus, Epson FX-80 and Diablo 630, with a variety of type fonts. Select from two output choices to stack your sheets in either original or reversed order. Two paper sizes, letter and legal, to suit your job. And two input trays let you handle 300 sheets at one time, or mix different papers—including letterhead, envelopes, and label stock.

But there is one other expensive feature we're missing. A big

price tag. At only \$2995\* you'll get more printer than the H-P Laserjet Plus for about \$1000 less.

### YOU'LL NEVER KNOW WHAT YOU'RE MISSING IF YOU DON'T ASK.

Find out more about our new Personal Laser Printer by calling 1-800-826-3874; 1-800-826-7559 in California. Or return the coupon for a quick response. Because it only takes a minute to cut out the maintenance man.



\*Manufacturer's suggested list price.

## PRINTRONIX

Corporate/U.S.A. Headquarters: Printronix Inc., P.O. Box 19559, 17500 Cartwright Rd., Irvine, CA 92713. Telephone: (714) 863-1900. Telex: 910-595-2535. European Headquarters: Printronix Europe S.A., Boulevard du Souverain 100, 1170 Brussels, Belgium. Telephone: (32) 2-660-2904. Telex: 20643 PRINTR B.

☐ Please send me more information on the Printronix Personal Laser Printer.  
☐ Please have a sales representative contact me.

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
CN

CUT OUT THE  
MAINTENANCE  
MAN

Diablo is a trademark of XEROX CORPORATION. FX-80 is a trademark and Epson is a registered trademark of Epson America, Inc. Printronix is a registered trademark of Printronix, Inc.

© 1986 Printronix, Inc.



## In Depth/Review Your Annual Reviews

should be identified and inventoried.

The lists of job functions and skills developed in Steps 1 and 2 will ultimately form the vertical axes of the job matrices. These axes depict the standards required for the various jobs in the department; the horizontal axes are the list of job positions themselves. However, there are still two more steps to perform before the matrices can be completed.

**Step 3: Identify what is relevant to becoming successful.** Once job functions and necessary skills have been identified, the next step is to identify the components of the skills that are relevant to the performance of specific functional tasks.

For technical skill areas in a DP organization where analysts analyze and programmers program, programmers need to be adept at certain aspects of the language in use that are not necessarily part of the realm of the analysts. For example, the components of technical skill that a programmer working with Lotus Development Corp.'s 1-2-3 should be expected to have mastered would include writing macros and using other automated tools for manipulating very large spreadsheets.

On the other hand, an analyst would not necessarily be expected to write the specific macro but instead would need to know the capabilities and limits of using macros and be able to integrate their use into a well-structured application.

The components of people skills tend to be relatively universal. The classic example is the definition of management, the components of which include, at the least, planning, organizing, directing, monitoring and reviewing. The components of interpersonal skills may be more nebulous to define, but it is possible to accomplish the development of identifying labels for these components with a reasonable investment in time.

**Step 4: Define progressive levels of performance and skill.** The next step is to define what constitutes distinct plateaus of performance and skill. Using measures in terms that are appropriate to the organization, sets of progressive levels of performance and ability — from entry level to expert — are identified. For job functions, in many cases it is appropriate to express performance levels in terms of the relative independence with which the function can successfully be performed — under close supervision, under minimal supervision, given general direction and so on.

While for job functions it is often possible to use a single scale for all elements, skill areas almost invariably

resist the use of such a tool. The components of technical skills just cannot be easily expressed in the same terms as communication skills or

management skills. Consequently, distinct scales for technical skills and each of the people skill areas will need to be developed.

At the same time, the narratives associated with the individual levels are developed. Each narrative spells out, in plain English, what a

certain level of ability is. In certain job functions and technical skill areas, quantifiable terms can be used: "Averages 95% of error-free code."

For areas that are not easily quantified, the different levels can be distinguished through other means. For example, the application of written communication skills can be assessed by identifying the nature of the written documents produced and to whom they are addressed. In

77

*The narrative serves as a valuable tool for career development because it helps answer the questions employees always have about what it would take to be considered for advancement to another job level.*

## INTRODUCING THE WORLD'S FIRST PERSONAL LINE PRINTER.

THE QUALITY SPEAKS FOR ITSELF.

You're looking at an actual print-out from our revolutionary new Personal Line Printer. It's the first time anyone's seen letter quality like this in a line printer that fits comfortably on the corner of your desk.

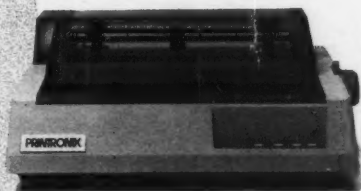
We did it by miniaturizing our patented line printer technology. The same technology that has proven so reliable and durable for high volume mainframe and minicomputer printers. So when it comes to letter quality, our printing is superior to the 24-wire serial dot matrix printers.

This print-out can't show you our versatility and ease of operation. Standard features like draft mode printing at 134 Lines Per Minute and letter quality at 47 LPM. Plug-in cartridges that emulate the IBM Proprinter, Epson LQ-1500, and the Diablo 630 with a choice of fonts. And both tractor and friction feed paper handling. But our most impressive feature is our price. For \$795.00\*, you get line printer reliability and letter quality printing. All at serial dot matrix and daisywheel prices. And that kind of value speaks for itself.

IT'S YOUR TURN TO TALK TO US.

If you've seen enough, you're ready to find out more about our new Personal Line Printer. Call 1-800-826-3874; in California, 1-800-826-7559. Or mail the coupon for a quick response. Because what you're seeing is a remarkable first: The Personal Line Printer from Printronix.

\*Manufacturer's suggested list price.



Print-out shows 78% of original dot.

- ☐ Please send me more information on the Printronix Personal Line Printer.  
☐ Please have a sales representative contact me.

Name \_\_\_\_\_  
 Company \_\_\_\_\_  
 Street \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_  
 Zip \_\_\_\_\_ Tel \_\_\_\_\_

Mail To: Printronix, Inc., P.O. Box 19559, M/S C-9, Irvine, CA 92713, Phone 800/826-3874. In California, 800/826-7559.

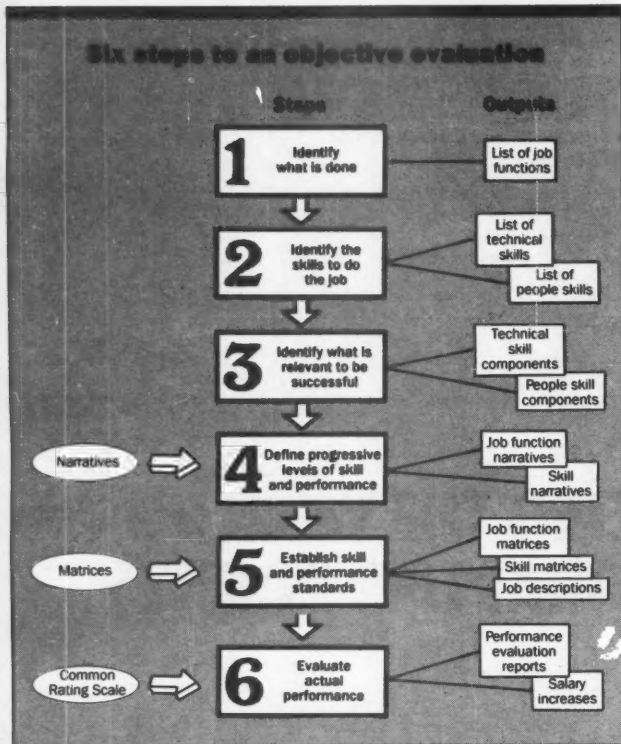
## PRINTRONIX®

Printronix is a trademark and IBM is a registered trademark of International Business Machines Corp. Diablo is a trademark of XEROX CORPORATION. LQ-1500 is a trademark and Epson is a registered trademark of Epson America, Inc. Printronix is a registered trademark of Printronix, Inc. © 1986, Printronix, Inc.

Corporate/U.S.A. Headquarters: Printronix, Inc., P.O. Box 19559, 17500 Cartwright Rd., Irvine, CA 92713, Telephone: (714) 863-1900. Telex: 980-593-2535. European Headquarters: Printronix Europe S.A., Boulevard du Souverain 100, 1170 Brussels, Belgium, Telephone: (32) 2-490-1904. Telex: 20643 PRINTR B.



## In Depth/Review Your Annual Reviews



Defining requirements and expectations for each staff position will yield output in the form of lists, narratives and matrices that help eliminate ambiguity and establish clear yardsticks for performance.

PACS for VAX for PACS for VAX for PACS for VAX for PACS for VAX

## VAX CHARGEBACK MADE EASY

More than 1,000 VMS sites know that chargeback, resource accounting and capacity planning are a snap... using PACS™ PLUS. Whether you have a single VAX, a VAXcluster or network, "PACS PLUS will fill the resource management needs of any VAX installation..." (DEC Professional Product Review, Feb., 1986).

**FOR A FREE TRIAL  
CALL TOLL-FREE 800-235-5787**

Signal Technology Inc.  
5951 Encina Road • Galesburg, CA • 93117 • (805) 353-3771

**Yes, send more information on PACS PLUS.**

Telephone: ( ) VAX model(s):  
Name: Title:  
Company: Div/Dept:  
Address:  
City: State: Zip:

I'm interested in: ☐ chargeback ☐ resource accounting ☐ capacity planning  
☐ free trial ☐ DEC Professional reprint.

Signal Technology Inc.

VAX, VMS and VAXcluster are trademarks of Digital Equipment Corporation. 5951 Encina Road • Galesburg, CA • 93117 • (805) 353-3771

a second example, progressive levels of microcomputer skills can be narrated as follows:

A. Expert in the use of the IBM Personal Computer; adept at complex DOS commands, all major software packages in use and network and communications functions.

B. Proficient in use of PC, infrequently needs support in use of complex DOS commands, efficiently operates five major software packages, strong working knowledge of network and communications functions.

C. Competent in use of PC, efficiently uses major DOS commands, efficiently operates at least three major packages, working knowledge of network and communications functions.

D. Familiar with use of PC, can use some DOS commands, knowledge of one major software package.

E. Limited experience with PC, requires basic or review training.

Once the standards have been defined, detailed descriptions can also be developed for each job position.

Such a scale retains uniformity regardless of how standards are expressed for each area, focusing attention on the question, "Did you do what you were expected to do?" It also takes into account the fact that different levels of performance are expected of different job positions. The following is an example of such a rating scale:

- 5 — Always exceeds standard.
- 4 — Frequently exceeds standard.
- 3 — Always meets standard.
- 2 — Usually meets standard but needs improvement in one or more areas.
- 1 — Occasionally meets standard.
- 0 — Never meets standard.

Each individual is evaluated according to the functions and skills specific to the position. Using this scale as an example, a rating of 3 denotes that the individual is performing at the expected level. Individual strengths and weaknesses as well as potentially underserved skills can be monitored to provide information for needed training or controls.

77

**Without a structure to set standards and rate achievements, the process consists of the manager forming an opinion of an employee's work and then struggling for the best way to express that in writing.**

If desired, weights can be applied to any or all of the rating areas to reflect the relative importance of the area. This is also useful in computing a weighted average to determine an individual's overall score. Since scores are all based upon a common scale of achievement, it is then possible to develop a forced ranking

of all individuals in a given group or set of groups. This forced ranking highlights the overachievers as well as the underachievers and can be a factor in determining the distribution of annual salary increases.

Regular performance evaluation reviews benefit both employees and management by structuring and thus enhancing performance management. Many DP organizations seem to approach performance evaluations with all the enthusiasm of impending root canal work. This is understandable, since in many cases evaluation takes a backseat to keeping operations functioning and users happy. Without a meaningful structure to set standards and rate accomplishments, the process consists of the rating manager forming an opinion of an employee's work and then struggling to find the best way to express those feelings in writing.

By basing evaluations on published, quantified standards that express expectations for job function and skill abilities, a solid foundation is established for effective long-term human resource management in DP departments. The steps outlined earlier make it feasible to do so. First, specific job functions are identified, as are the skills necessary for successful performance of those functions. Next, progressive levels of ability and skill are defined, followed by the setting of performance standards for each position. When it comes time to evaluate actual performance, the measure is the degree to which those standards have been met. The process works, and it can work for you.

ment because it helps answer the questions employees always have about what it would take to be considered for advancement.

**Step 5: Establish standards.** The next step is to establish performance standards. Following the definition of the applicable scale(s) to be used, the level of performance or skill that is to be expected from personnel in any given job is determined for a specific function. The skill narratives listed above are based on a standard structure of progression through four or five levels. Levels A through E can be used to represent various standards for each job function or skill for each job level.

Depicted in matrix form, a single picture of departmental standards is produced for typical job functions (see chart page 61). A matrix for job skills would be identical in style; the list of skills would replace the list of functions forming the vertical axis of the matrix.

The definition part of the process is now complete. Specific job functions have been identified for each job position, as have the skills that are necessary to fulfill assignments. The results can be distributed to the work force, laying the groundwork for the next step — formally evaluating individual performance.

**Step 6: Evaluate actual performance.** In rating individual performance, a third tool is used to make the evaluation meaningful and reduce the influence of subjectivity. This tool is a common scale that expresses the degree to which established standards have been met over the course of the evaluation period.



## In Depth

# Automating Glitter Gulch

## *Las Vegas DP managers must play it safe*

*Profiles of DP managers in five major Vegas hotels show familiar concerns: disaster recovery, inventory control and near-zero downtime. Yet their data bases track jackpots, high rollers and last-minute Superbowl betting.*

By COLIN MCKINLAY

**D**ata processing managers in the desert resort of Las Vegas, with its half-million permanent residents, operate their departments around the clock, the same as the facilities they serve operate, but little of the glamour of their business rubs off on their jobs.

Take, for example, Bill Watson, manager of the data processing operation at Bally's Grand Hotel, formerly MGM Grand. Watson calls himself "basically a systems man. I solve problems by devising a system that can be partially or completely computerized, depending on the need. We don't computerize for the sake of computerizing."

A 25-year veteran of the computer industry, Watson started out doing customer servicing at Bache & Co. of New York, moved on to Pan American Airlines, where he pioneered an on-line worldwide petroleum inventory system, and then took on inventory control at pharmaceutical maker Geigy Chemical Corp. From there, Watson moved to ABC, where he managed the processing of election returns, and then to Montefiore Hospital & Medical Center, where he developed an on-line customer billing system. He landed in Las Vegas via a job opportunity advertisement placed by MGM.

Watson manages an IBM 4341, an Elec-

tronic Engineering Co. Hotel Management System, an on-line race and sports book system using Data General Corp. equipment, a Datapoint Corp. telephone management system, an AT&T private branch exchange (PBX) running Integrated Hospital Network, Inc. software, and an IBM Series/1 that ties into the IBM 4341 to provide management with payroll and employee meal information.

Front office functions — including reservations, registration, city ledger accounts and files maintained on regular customers — are handled by the Electronic Engineering Hotel Management System. In the back office, the IBM 4341 is the workhorse, Watson says. It is there that all casino revenue accounting is done, along with the hotel and corporate general ledger and accounting functions.

### Optical scanners for badges

The system also handles personnel functions: Bally's employees are issued badges that are inserted into an optical scanner as they report to work, and their attendance is automatically recorded on the Series/1. The badge is used similarly when eating at the employee cafeteria, since many employees, under the terms of union contracts, are entitled to one or two meals a day. When employees leave for the day, the badges go back into the machine for checkout.

The 4341 also maintains about 20 different kinds of mailing lists for the sales staff to use for soliciting new business for the hotel. Sales offices around the country are tied into the computer so that information about groups and conventions, as well as contracts and future commitments, can be kept current.

The DG hardware is used for the race and sports book system. It does accounting, prints betting tickets, manages payoffs and provides a daily summary.

The PBX Inquiry System, manufactured by AT&T, is tied into the Electronic Engineering system and provides a display board for telephone operators. An operator punches in as many letters as are necessary to get a display and room number for each guest. The system also is used to keep track of key employees when they are away from their desks.

In the way of change, Watson reports that a new payroll system is in the works; the payroll department currently does not have on-line access to the computer. Watson is also actively pursuing the development of an on-line purchasing and inventory control system to enhance his department's capability. "We are always looking to stay up to the minute in our



PHOTO COURTESY OF LAS VEGAS NEWS BUREAU

About the author  
McKinlay is editor of the Las Vegas Business Press.

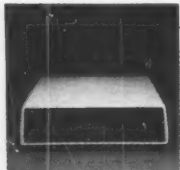




# WITHOUT THE DATAPHONE II SYSTEM,

## WE KEEP YOU UP AND RUNNING.

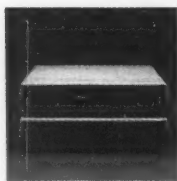
Behind the frantic scenes of a typical trading floor, a family's at work, keeping everything under control.



2248 Analog Switched  
Network Modem

The DATAPHONE® II System family from AT&T is a series of integrated data communications products designed to

keep a computer network up and running. By constantly monitoring and measuring it, the DATAPHONE II Network Management System enables



2024T/2048T Modems

the network to handle the tremendous flow of buy and sell orders.

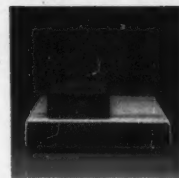
With millions of dollars traded every minute, consider what a half-hour of downtime would add up to. And what the same amount of downtime would cost *your* company.

Little wonder why having reliable data communications equipment is so critical.

## BRAINS RUN IN THE FAMILY.

Each member of the DATAPHONE II System family has vast ability. There

are *Analog Modems* for point-to-point or multi-point applications. *Data Service Units* provide digital data transmission at a range of speeds along with the capability to handle added diagnostic tasks through our network management system. *Multiplexers*, an important part of network management, channel a number of low-speed lines into one efficient high-speed link.



2600/2700 Series DSU

**DATAPHONE II Network Management Systems** are the nerve centers of the family, permitting you to monitor and manage your network and keep





# THIS PLACE WOULD BE CHAOS.



724 T-MUX

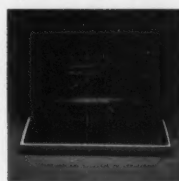
your system up and running. Finally, AT&T's *Maintenance Operation Control Centers* (MOCC) provide remote monitoring and testing of your network—and dispatch our service staff should the need arise.

By enabling each component to interact synergistically, the DATAPHONE II System takes your mind off computer networks and puts it back on business.

## WE MAKE THE PIECES FIT.

The fact that AT&T is a leader in data communications equipment should

come as no surprise. After all, we built, manage and service the largest network in the world. We know firsthand the benefits of an integrated system.



System Controller

And why a whole system, rather than stand-alone pieces, is what keeps your network up and running.

For more information about the DATAPHONE II System, call your AT&T Account Executive, or call 1 800 247-1212.

It can have a calming effect on your workplace.

©1986 AT&T



**AT&T**

The right choice.





## Now You Can Communicate Anywhere With Anything.

TYMNET's public data  
network provides communi-  
cations to anywhere with a  
local phone call from virtually  
any city, connecting different  
types of computers, terminals  
and PCs.

**No one does it better.**

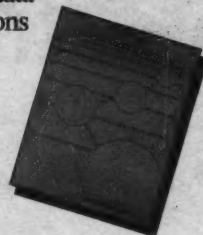


---

### **NEW**

---

For business data  
communications  
users: Call  
or write  
for your  
FREE  
copy of  
TYMNET's  
Public Data  
Network Brochure.



Tymnet  
2710 Orchard Parkway  
San Jose, CA 95134  
(408) 942-5254 ext. 68

---

**One Company, Many Solutions.**

---

**TYMNET**

**MCDONNELL DOUGLAS  
NETWORK SYSTEMS COMPANY**



## In Depth/Las Vegas DP Managers

hardware. The state-of-the-art equipment is always under review," Watson says.

Also state of the art is a Johnson Controls JT80 fire control system with speakers in every guest room, a reaction to MGM Grand's tragic 1980



Bill Watson of Bally's Grand Hotel: "I'm basically a systems man."

fire that took scores of lives. Fire is one of Watson's major fears, although he says fire control procedures were drastically improved with the reconstruction of the hotel.

"You set your procedures to prevent a fire loss. You are always reviewing. You have dry runs to make sure that you can recover, but you never really know if it's going to work until it happens," he says.

The 1980 fire destroyed the hotel's computers, but the records sat in fireproof lockboxes and were undamaged. "We didn't miss a payroll after the fire," he reports.

There is one aspect of the business that is not discussed freely because of its sensitivity, but it is extremely important to the people who run the casinos. It is the "folio" kept on high-betting customers, and it determines how they will be rewarded when they check out of the host hotel.

Their reward could be any combination of free room, food and beverages — identified in the industry as RF&B — depending on the amount of money spent at the tables. At many casinos using data processing equipment, financial transactions made during the stay of the guest are entered into a folio as they occur.

A casino executive then makes a determination as to the liability of the guest for charges incurred, which are usually assigned to the room. The decision by the casino executive often determines if the guest will come back or go somewhere else.

The folio contains personal information about the guest, such as his occupation, banker and established credit line. This information is carefully guarded by the casinos. The system was devised by the corporations when they took over the many casinos owned by partners — who carried folio information in their

heads 20 years ago.

At Bally's Grand, Watson says, computers maintain two kinds of files on guests. The A file is for the regular guest, and the B file is for the preferred guest. "We even keep track of the birthdays or anniversaries of our better guests," Watson says.

At the 1,600-room Caesars Palace hotel, "the systems run 24 hours a day, because our business never stops," says Lyle Bell, director of data processing. "It is rare for us to have a system go down for more than 10 minutes. Our programming and operations staff is committed to keeping these systems up."

Bell joined Caesars Palace in 1984, after four years as director of data processing for a manufacturing firm and eight years as a management information consultant with the accounting firm of Arthur Andersen & Co. in San Francisco.

Bell runs his department with two NCR Corp. 8550 mainframes, which are used for the front-desk system and for most of the accounting systems. This equipment, in use since 1976, is on the way out.

#### 'Need to move ahead'

"It has served us well," Bell says, "but we need to move ahead with new technology. We need to transfer information on preferred guests into the casino information system on a more timely basis."

The department has used an IBM 4361 Model 4 since mid-1985, and that machine is now being used to bring up a new payroll/personnel system. New accounting software is destined for this machine in the future.

Caesars uses a Tandem Computers, Inc. Nonstop system for the race and sports book and for the casino information system.

"We need to replace our front-desk system, and we are looking at other possibilities. We have found that most front-desk systems are geared for hotels smaller than Caesars, so it will be a challenge to find something that will work for our size resort and

can be integrated with our casino information system," he says.

#### Player incentive programs

Another system on the horizon would connect slot machines to a data collection and information processing base. This would give the hotel accounting and internal control information and provide an opportunity to market slot machine play through player incentive programs.

"For example," Bell says, "it is possible to issue a slot player a card to insert into the machine and accumulate points based on coins in and handle pulls. The bonus points could be used to award the player prizes or other compliments."

Bell says another major applica-

tion under construction is a casino accounting system that will be integrated with the casino information system. This system will automate fill and credit accounting at the tables and more efficiently prepare the "stiff sheet," which reports casino wins and related information by various areas in the casino.

Bell says there have not been any computer disasters at Caesars while he has been there, but that there were some anxious moments when the race and sports book system went down for a few minutes prior to a major football game — a critical time because of last-minute bets.

His secret nightmare would be a problem with the Tandem system on New Year's Eve or before the playing

of the Super Bowl. This year, both events went off without a hitch.

Although it is a year or two away, Bell wants to provide the front-desk cashiers with point-of-sale information from the cash registers, "which most other places have."

"The whole idea is to keep the guest happy," says Jack L. Braman, director of management information systems for Hilton Nevada Corp., which includes the Las Vegas, Flamingo and Reno, Nev., Hiltons.

That process begins at Compass Computer Systems, a Hilton subsidiary, which maintains two IBM 3083s in Dallas to track Hilton



A 1980 fire destroyed the former MGM Grand's computers, but its records were safe in fireproof lock boxes. Says Watson: "We didn't miss a payroll."



Lyle Bell of Caesars Palace: "Our business never stops."

\$445.

A small price to pay for a full-duplex 2400 bps dial modem that lets you operate synchronously, or asynchronously with a unique auto dial feature, on virtually any computer.

Plus it's Hayes compatible. And available as a standalone unit or dual modem card, which lets you pack 32 modems into a single Codex nest.

The Codex 2233 dial modem. Find out about it. Call 1-800-426-1212. Ext. 230.

**codex**  
MOTOROLA

Motorola and @are trademarks of Motorola, Inc. Codex is a registered trademark of Codex Corporation.  
© 1986 Codex Corporation.



## In Depth/Las Vegas DP Managers

reservations on a worldwide basis. Braman takes over once the guest arrives with the help of an Ontel Corp. system consisting of 58 terminals and 29 printers located throughout the hotel.

The Hilton staff uses the system to take care of guests' needs while they are in the hotel, from check in to checkout. The system interfaces with point-of-sale devices — cash registers — and automatically tallies transactions charged to guest rooms, tacking them onto the customer's bill.

A Northern Telecom, Inc. telephone system automatically prices all phone calls and adds them to the guest's folio. The housekeeping department keeps track of the condition of the guest rooms through this system.

When a maid finishes cleaning a

room, she picks up the phone, dials a number and reports that the room is ready for occupancy. This information goes to the computer and is available to the staff at the front desk for use in assigning the rooms.

An IBM Series/1 Model 4956 handles the accounting system, the general ledger, accounts receivable, casino accounts, accounts payable and hotel and casino payroll using 12 terminals and five printers.

**Bell says there have not been any computer disasters at Caesars while he has been there, but there were some anxious moments when the race and sports book system went down for a few minutes prior to a major football game — a critical time because of last-minute bets. His secret nightmare would be a problem with the Tandem system on New Year's Eve or before the playing of the Super Bowl.**

Soon Braman will provide hotel executives with daily profit-and-loss statements, an improvement over the current monthly statements produced by the system. "This system also talks to the corporate office in Beverly Hills, Calif.," Braman explains.

Slot machines are monitored by a Digital Equipment Corp. PDP-11/24, which tells the slot manager in hard-copy form how many coins were dropped in each machine, the number of coins paid out and how many times the handle was pulled. It also detects any mechanical failures and notifies the surveillance department monitoring the casino of any big jackpot.

Casino player history is maintained by an IBM System/38, which keeps track of receivables, accounting in the casino cage, the casino back-office accounting, disputes and all casino systems. It can display a guest signature on a screen to be viewed by hotel employees processing checks or markers. There are 55 terminals and 27 printers connected to the System/38.



Jack Braman of Hilton Nevada: "Keep the guest happy."

## Shouldn't you be a Subscriber?

If you want the complete inside story on the information management revolution, there's only one publication you need: **COMPUTERWORLD.**



### COMPUTERWORLD makes you an insider!

COMPUTERWORLD is the newsweekly computer professionals read. It's also the weekly for people in all areas of management who need to know what's going on, who want to be plugged into the information-management revolution.

COMPUTERWORLD is the source! Hardware. Software. Systems. Updates. Revisions. Add-ons.

COMPUTERWORLD is comprehensive. It covers micros to mainframes. Manufacturers. Systems. Applications.

COMPUTERWORLD puts it in context. What's new. Who's it for? What's compatible?

COMPUTERWORLD helps you decide. Buy it now or later? What do you lose if you wait? Is there something better on the drawing boards?

### Subscribe Today!

There's no time for mailing coupons. For fast start-up, phone the toll-free number below and start your own subscription today at the special professional rate. Just \$44 for 51 weekly issues of COMPUTERWORLD... plus, 10 in-depth, single-topic issues of COMPUTERWORLD FOCUS at no extra charge. A bonus. A bargain. Indispensable!

**1-800-544-3712\***

### COMPUTERWORLD is for users!

Written from the user's point of view... yours. What's right for your needs? How can you be sure? What are others buying? Are they happy with what they have?

How can you get more and better service and support from suppliers? Should you buy or lease? What are the disadvantages of one product or system vs. another? What didn't the vendors tell you that you need to know? See COMPUTERWORLD!

We have the largest, most experienced editorial staff of any computer publication. Full-time bureaus in four U.S. regions, plus Paris and Tokyo. A worldwide editorial staff of over 400 editors and reporters. Information is our subject and no one is more adept at gathering it.

"This also helps us analyze a special event or the success of a junket," Braman says.

In April, the Hilton started to computerize its function book, which keeps track of special events such as conventions. IBM Personal Computers, of which the hotel already has bought 24 and expects to buy another 20 this year, represent part of an effort to increase department productivity.

### First of many steps

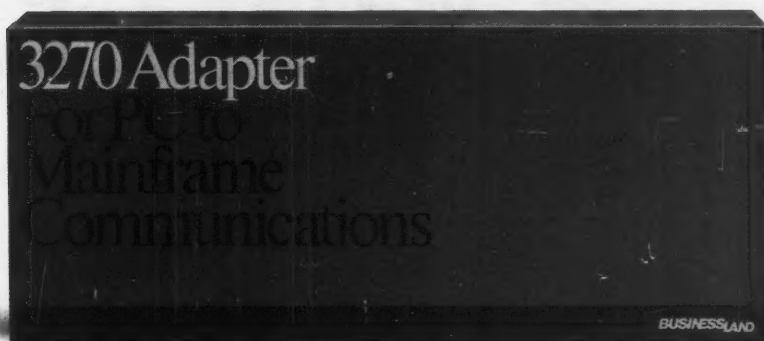
The function book is the first step in an attempt to give departments access to all function information, Braman says. Computerization of the engineering department functions is scheduled for this summer. The computer will keep track of trip tickets — work orders to make repairs — and will document time and costs for repair jobs.

According to Braman, the computers provide a cost forecast, establish preventive maintenance scheduled according to the manufacturer's recommendations and determine when something should be replaced rather than repaired. He adds that voice recognition is being studied as a possible replacement for keyboards and that inventory control is another area of interest.

Braman says he has no great fears about the system and can recall only one serious problem in the past 14 months. Three power surges blew out diodes late one evening, and the



# IF YOU CAN'T CHOOSE BETWEEN IRMA AND IBM, DON'T.



Choose the Businessland 3270 Adapter, instead.  
So you can use all the software you've been running  
with your IRMA\* card. And all the software coming from  
IBM\* for its 3278/79 card.

Without having to choose between the two.  
The Businessland 3270 Adapter lets IBM PCs,  
COMPAQ\*s and compatibles communicate with IBM  
mainframes.

Just like the other 3270 emulation boards do.  
But it runs all the competitive software.  
Just like the other boards don't.  
Plus it provides multiple host session, host printer  
support and windows and graphics.

And it's backed by Businessland's trained 3270  
specialists, who provide service, support and introductory  
customer training nationwide.

So call (800) 323-1000 for further information. And see  
what a good choice our 3270 Adapter is.

**BUSINESSLAND.**

Where business people are going to buy computers.



## In Depth/Las Vegas DP Managers

front-desk system was out of commission for an hour, but there were no guest complaints.

□

The data processing manager for the Union Plaza in downtown Las Vegas is Alan Dattge, who has held the position since October 1979.

A native of Las Vegas, Dattge worked for eight years in the accounting department at the El Cortez Hotel before joining the Union Plaza. The El Cortez management sent him to programming courses, and he picked up the rest of his expertise "piecemeal."

His equipment includes two IBM System/34s, one IBM System/36, a Tandem Nonstop II, a Remanco Systems, Inc. point-of-sale system for the hotel's Center Stage restaurant, about 70 CRTs around the hotel and 25 printers of various models.

The Remanco system provides a keyboard for a food server to enter a code number for a food order. For example, 525 might be a roast beef sandwich.

The order is printed out for the cook, and when the guest is finished eating, the system prints out the bill, breaking down the amount spent on food items, the bar and taxes.

"I am fighting for an inventory control system that will allow us to keep a better handle on our costs. As prices fluctuate, the system will automatically update the cost of menu items and let management decide how to structure its food. There is an IBM inventory and purchase order control system that does this automatically," Dattge says.

The System/36 "runs the hotel," with software from Pleasant Hill, Calif.-based Hotel Information Systems. Dattge says the software is used by more than 200 businesses around the world. The system handles reservations, check ins and checkouts, room availability, accounts receivable and commissions for travel agents.

#### Tracking gambling activity

The System/34 handles the gambling part of the hotel operation. It provides a game analysis and slot machine input. The daily drop is counted, as is the number of jackpots paid during a 24-hour period. Every seven days, a reading is taken of the slot activity. There is a meter reading of the number of coins put in the machine to produce a hold percentage.

For the table games, the machine keeps track of the drop for 21, craps and roulette on the basis of three shifts per day and calculates a drop-and-win percentage. There are daily totals,

monthly totals and yearly totals — standard operating requirements of the Nevada Gaming Control Board, which polices the industry.

The Tandem Nonstop appears to be almost the standard of the race and sports betting industry. The Union Plaza's version gives each ticket writer his own computer terminal and allows information on eight tracks in the U.S. to be sorted out simultaneously for the players.

"All major sporting events can be handled," Dattge says. Every 24 hours, there is a series of management and auditing printouts. The computer prints the betting tickets, stores one copy and computes the winning prices, which are put on a display board manually.

The Union Plaza also has an automated attendance system, with the employee identification badge being used to check in and out of the time office. Dattge says

”

*Dattge has had no problems with the equipment, but half a dozen yearly power outages — usually when the wind blows — cause a few gray hairs, because "we don't have backup power here."*

# PRINTERS'

For what you  
used to pay for  
a 9-pin printer

When you see our new Pinwriter™ P6, P7 series dot matrix printers, you'll think you're in a time warp.

These are the first 24-pin printers that list for as little as \$699. Or about what you would have paid for an ordinary 9-pin printer a year ago.

Now, that's progress. Especially when you consider our new printers have an advanced 24-pin printhead. And print data at 216 characters per second and crisp, dense letter-quality at up to 65 cps. Which is as fast as most 9-pin printers turn out data quality.

Actually these new Pinwriter dot matrix printers surpass every other printer in their price range. In their combination of speed, graphics resolution, the number of built-in fonts and low noise level.

None of which will surprise you if you know NEC printers. Because nobody does more with 24-pin technology than NEC. In fact, we now have more 24-pin printer models than any other manufacturer.

**NEC** Computers and Communications

© 1986 NEC Corp.



## In Depth/Las Vegas DP Managers

this gives management a daily labor cost for the profit-and-loss statement.

#### More than push buttons

Dattge says that the biggest problem is trying to get management to understand the capabilities of the computer. "They seem to think that all you have to do is push a button and out comes any kind of information. They don't realize that input is required. Too often, they think this is already done,"

**"Management seems to think all you have to do is push a button and out comes information. They don't realize input is required. Too often they think this is already done."**

— Alan Dattge  
Union Plaza

Dattge says.

The computer provides the labels for mail-out literature on eight yearly pan tournaments, six gin tourna-

ments and, now, four slot machine tournaments. The hotel will have its own slot club, with the members being treated to parties, overnight

stays and prizes.

Dattge operates his 24-hour department in a room with a 71° F controlled temperature — standard operat-

ing procedure — with a staff of six. Two people work days, one works a swing shift, one works the graveyard shift and two are scheduled for relief shifts.

He has had no equipment problems, but half a dozen yearly power outages — usually when the wind blows — cause a few gray hairs, because "we don't have backup power here." His backup system, begun in 1985, consists of microfiche files of everything that is computer generated.

□

Carole A. Carter, managing director of corporate computer services for Summa Corp., refers to the departments she works with as her "customers," because she feels that it is just as important for her to keep them happy as it is for them to keep the tourists happy.

At Summa, a company that was formed to manage the Las Vegas acquisitions of

# PROGRESS.

now, you can buy  
our fully-featured  
24-pin printer.

So if you're looking for a printer that will do more and do it better, just progress to your NEC dealer and you'll get it for less than you imagined.

If you would like more details about our full line of 24-pin Pinwriter printers, call 1-800-343-4418 (in MA 617-264-8635). Or write: NEC Information Systems, Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.



**NEC PRINTERS. THEY ONLY STOP  
WHEN YOU WANT THEM TO.**

## NEC

NEC Information Systems, Inc.

BUY • SELL • LEASE

34.

BUY • SELL • LEASE

36.

BUY • SELL • LEASE

38.

**We're your one-stop  
shopping center for  
IBM® systems and  
peripherals.**

Dataserv has been in business for 15 years  
and we've participated in thousands of  
transactions totaling almost \$1 billion.

**TRADE- your  
BUY/LEASE- a new  
for 68%! System 36  
CALL FOR  
DETAILS.**

We're a leading source for Series 1, S-34, S-36,  
S-38 and large systems and peripherals.  
Before making your next computer equipment  
decision, ask for a DATASERV QUOTE.

Call Anne Gelhar...  
**TOLL-FREE**  
**(800) 328-6729**

**dataserv**

When you know what to buy  
Let us show you how and why.

IBM is a registered trademark of International Business Machines Corporation.



## In Depth/Las Vegas DP Managers

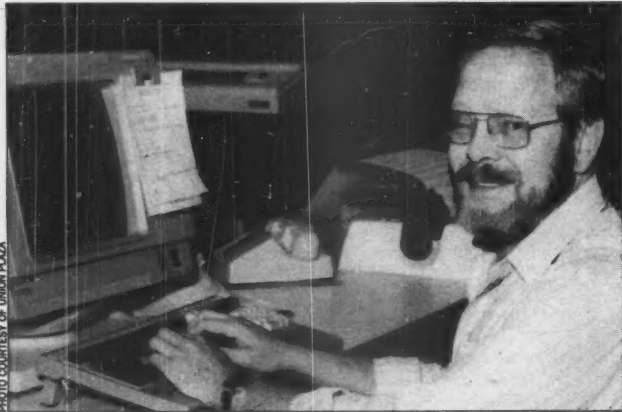


PHOTO COURTESY OF UNION PLAZA

Union Plaza's Alan Dattge: Fighting for better inventory control.

the late Howard Hughes, Carter's customers include the Desert Inn, the Frontier, Sands, Castaways and Silver Slipper, all located in Las Vegas, and occasionally Harold's Club in Reno, Nev.

In addition, Carter's 75-member staff provides services for Summa's real estate division, which includes offices in Los Angeles, and Hughes Aviation Services, a fixed-base operation at McCarran International Airport that is the destination of many major airlines' charter flights to Las Vegas.

Carter worked her way up to her present position through seven years of service with Summa as an assistant controller at the Sands Hotel, as a member of the corporate computer services staff and as director of account control.

"We are a total IBM system," she

says, and this system, like others in Las Vegas, operates 24 hours a day, seven days a week. The one exception comes when they shut it down for 90 minutes every Tuesday for maintenance.

The data processing department, which handles four million transactions a month, is located in its own building a block west of the Las Vegas Strip.

## IBM shop

The system includes two IBM 4381 Model Group 2 CPUs; one IBM 4341 Model Group 2; 325 remote printers and terminals throughout the Summa empire; 105 local terminals in the data processing department; and seven IBM Series/1 minicomputers.

"We support our own casinos. In-house development and design for the hotel application was done by the department," she says.

The machines perform standard functions such as general ledger, with McCormack & Dodge Corp.'s general ledger accounts payable package, as well as capital projects, payroll, personnel and insurance for employees.

Carter's group created the software for the aircraft operation that keeps track of aircraft maintenance, parts inventory and accounts receivable, and it provides the same services for charter planes that major scheduled carriers provide — passenger seating, check in, a manifest and a video display screen that displays arrivals and departures throughout the Hughes terminal.

"We also have a business systems information center support group that is responsible for the acquisition and installation of microcomputers and subsequent training of all users," Carter says.

On the drawing board now are plans for a shift from a centralized to a distributed environment. When completed — within a few months — the system will include a mainframe connected to a minicomputer system that is specifically designed for a given department, as well as the addition of microcomputers to departments, Carter explains.

"With microcomputers connected to the mainframe, our customers can download selected information to their microcomputers. They can rearrange their data in the format they want to see printed out or add information for a whole new report," she says.

## Cash register connection

A recent addition to the system is the connection of cash registers at the Frontier to provide instant point-of-sale data on guest purchases by hooking the NCR Corp. cash registers into the IBM mainframes.

"We are looking at another system for the Desert Inn," she says. "All we have to do is provide a communications link."

The only complaints registered come from guests who say the computer is too slow, particularly when they are standing in line waiting to be checked into rooms. "It's critical to have our computer work as fast as possible," Carter says.

Carter's overall philosophy, based on the fact that data processing work is charged back to users, is clear: "The customer is always right. I'm always available for their complaints, and I take their phone calls. We must provide the best service we can."

## Without the right connections, you could pay a lot to deliver a little raster data.

There's no question that a raster processor is a wise investment. Without it, your computer is loaded down processing raster data for your hard copy devices. But unless you're careful, you could pay a fortune for a processor with more capacity than your plots demand.

That's why we designed our VP-10. For all but the densest plots, it's got all the processing power your hard copy devices need — at less than half the price of most high-volume processors.

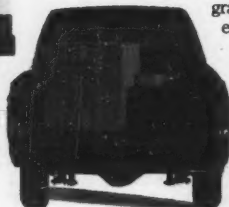
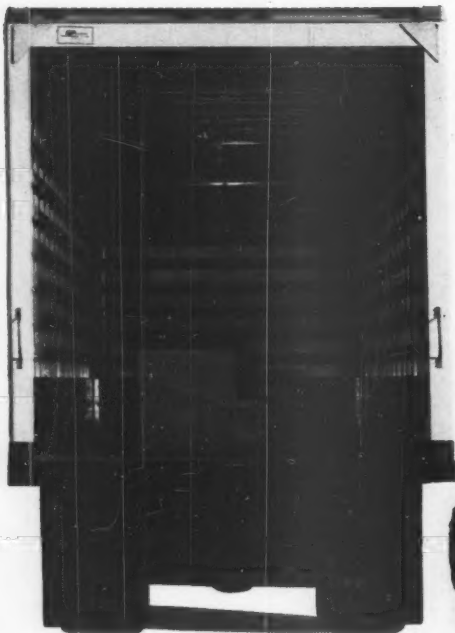
The VP-10 will dramatically speed your plotting. Its pipelined architecture allows it to simultaneously receive input from your computer while it outputs data to the plotter. So communications between computer, terminal and plotter are lightning fast.

It's also versatile. Most popular hard copy devices are supported, including Benson, Calcomp and Versatec plotters, as well as the Seiko D-Scan thermal plotter, Matrix QCR camera and Minolta SP 50-B laser page printer. A variety of input options (such as HPGL, Calcomp 906/907 and KMW.PLT) provide for easy connection to the host.

Best of all, the VP-10 has KMW's unmatched reputation behind it. We built the very first graphic element processor 10 years ago. And we've been innovating

graphic processing solutions ever since.

So why pay for more raster processor than you need? Call KMW today at 1-800/531-5167 (in Texas, 512/836-8080) or write KMW Systems Corporation, 8307 Highway 71 West, Austin, Texas 78735.



**KMW  
SYSTEMS  
CORPORATION**

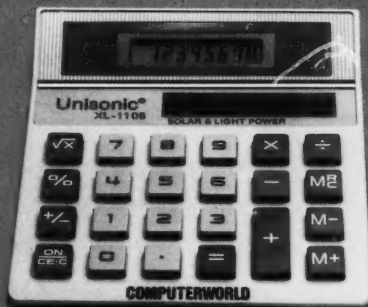
*For the right connections*

Annex is now a division of KMW Systems Corporation.

Registered trademarks: Benson—Benson, Inc.; Calcomp—California Computer Products, Inc.; Versatec—Versatec, Inc.; Matrix QCR—Matrix Corp.; Minolta SP 50-B—Minolta Corp.; Seiko D-Scan—Seiko Instruments U.S.A.



## PRINCE BENEFITS!



Collect two big bonuses with your paid subscription to **COMPUTERWORLD**. **BONUS 1:** Our Desktop Solar Calculator — large keys, easy-to-read LCD display, and it never needs batteries. **BONUS 2:** 10 issues of **COMPUTERWORLD FOCUS** for in-depth analysis of timely topics such as UNIX<sup>™</sup>, communications, office automation, and much more!

To subscribe, complete the attached order form and mail in this postage paid envelope. Or call 1-800-544-3712\* for faster service.

\* In PA call collect 215-768-0588.

**COMPUTERWORLD**

Keeping Up With Today. Anticipating Tomorrow.







NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



**BUSINESS REPLY MAIL**

FIRST CLASS MAIL PERMIT NO. 55 SOUTHEASTERN, PA 19398

POSTAGE WILL BE PAID BY

CIRCULATION DEPARTMENT

**COMPUTERWORLD**

P.O. Box 1016  
Southeastern, PA 19398-9984





# MANAGEMENT

## Data as competitive edge

### Big Eight partner looks at shift in consultant approach

By Eddy Goldberg

The focus of MIS consulting has changed in recent years from applications development to the use of information technology to give businesses a competitive advantage, according to Joel Friedman, a partner in the Management Information Consulting Division of Arthur Andersen & Co.

In a recent interview, Friedman discussed issues raised by the use of information for competitive advantage, a term that his firm has dubbed IFCA.

**CW:** Is the concept of IFCA appropriate for every company?

**FRIEDMAN:** I think it's probably [appropriate] for every organization. How formally you try to adopt the concept is going to

vary with management style. I'll start with the premise that every organization would like to achieve a competitive advantage. Therefore, every organization has at least some opportunity to use information as a competitive weapon.

Some industries are far more amenable to the concept than others, and it depends on something we'll call information intensity. Every organization has some opportunity to use information as a competitive tool, but based on the nature of the industry and the markets they're in, you'll find varying degrees of success.



Friedman

**CW:** Should executives be wary of competitive strategy hype?

**FRIEDMAN:** Sure. Every five years or so, whether it's in the information systems arena or the business strategy arena, there is a new buzzword or matrix or technique. None of these things taken by themselves represent a panacea. There is

See DATA page 86

## Information carries legal liabilities

By Donna Raimondi

In an increasingly litigious society, companies that sell computer-generated information or design are finding themselves in a vulnerable position. But, according to Peter Marx, a Boston lawyer who specializes in computer law, information managers can take steps to protect themselves.

Courts are starting to raise questions about who is responsible when incorrect information ultimately damages someone. The following examples are some of the cases in which judgment has already been reached:

- Families of the victims of a World Airways crash in Alaska collected \$12 million in a lawsuit against Jeppesen and Co., a chartmaker, and the Federal Aviation Administration. The pilot of the ill-fated plane had relied on Jeppesen's allegedly inaccurate charts that portrayed instru-

ment approach procedures — graphical drawings based on faulty government data.



Marx

- A federal appeals court in Boston ruled in May of this year that the U.S. Weather Service was not liable for an erroneous forecast that led to the deaths of four lobstermen.

- A researcher for Dun & Bradstreet Corp.'s on-line credit data base entered incorrect information about Greenmoss Builders, Inc., a contractor, that claimed the company had filed for bankruptcy.

Greenmoss sued Dun & Bradstreet for libel and sought damages for financial loss after the information was passed on to interested parties. Greenmoss won.

Answers to the question of who is legally responsible begin with principles of

See INFORMATION'S page 88



### TAKING CHARGE

David R. Vincent

## Making MIS a profit center

The profit motive is fundamental to our economy. It has been demonstrated over and over that when an activity cannot be related to profit, its management becomes vague and lacks clear business direction.

At its recent executive roundtables, The Information Group, Inc. found that most MIS executives operate as a non-profit function and lack a cohesive framework in which to direct their department.

This situation can affect the careers of MIS managers. Their contributions are not always recognized because they are difficult to measure. Furthermore, the manager of a nonprofit function in a profit-oriented company is an enigma. Senior executives are reluctant to accept someone who plays by special and very hard-to-understand rules.

MIS must find a way to demonstrate its value or continue to be perceived as a noncritical factor in the business. There are many ways to demonstrate value, but the most convincing is return on investment.

Take, for example, the case of an MIS group at a utility company faced with the problem of measuring return on investment. The group was constantly under-funded. Its strategic importance was not clear and the perception of its value was minimal.

To begin correcting this situation, the group's head decided to let his department's end users directly bear the cost of information services.

See MAKING page 89

Vincent is president of The Information Group, Inc., a facility for research, executive education and consulting.

### INSIDE

Calendar: Shows, conferences, seminars/82

### INSTANT ANALYSIS

"With the trend toward the distributing and downsizing of computing, mini MIS groups will be established in each department. Central MIS will take on more of a consultative role."

— George Colony, president of Forrester Research, Inc.

## Rise of end-user computing brings new challenge to MIS/DP

### Data centers effective management tools

By Eddy Goldberg

The fact that end-user computing has arrived is irrefutable. Estimates show that by 1990, 80% of all computing will be conducted on end-user technology, according to the MIS Research Center at the University of Minnesota. But what end-user computing is and how its rapid growth should be managed are not as clear-cut.

"End-user computing is the unstructured use of computers by someone who is not a professional in data processing," according to Naomi Lee Bloom, a senior principal at American Management Systems, Inc. in Arlington, Va. "Management of end-user computing is the management of people doing unstructured things," Bloom adds.

This is not an easy mandate for MIS and DP departments accustomed to more centralized control. However, as microcomputer use in corporations continues to grow, it is a challenge with which MIS and DP managers must deal.

Implementing controls while still serving the needs of both the end-user community and the corporate-wide information systems function can be tricky.

"Management has to be more or less formal and rigorous, depending on what's going on," Bloom says. "We equip everybody with micros and encourage their use. For some users there are no controls. But as end-

user computing begins to take on the same role and authority traditionally handled by DP computing, it will need to have that same level of control," she asserts.

The Bank of New England in Boston has already installed seven personal computer local-area networks to serve its microcomputer users and is planning more.

"You walk a really fine line in managing end-user computing," says Danielle Barr, vice-president of corporate systems. "You have to have some control, but without stifling innovation absolutely. We institute only those controls that will help us keep moving forward." Barr cites standardizing software as one example.

She says end users are encouraged to work with the Information Center

or the PC Coordination Center to develop new applications, but questions the need for users to become skilled programmers. Instead, she emphasizes the technical support and resources of the centers available to end users. "They get the idea, we develop it. They want the solution," Barr says.

This partnership is contributing to the greater scope of activities for information centers in general. "The PC management function is evolving, becoming more mature, a more ingrained part of the corporate environment," Barr says.

As a result, information centers that are only corporate "PC stores" are no longer viable, she says. Applications development tied into the needs of the corporation represents

See RISE page 84



## MANAGEMENT


**TURNAROUND  
TIME**

Larry Long

**Q** Last year I chaired a committee that conducted an exhaustive search for a new computer system. Our recommendation, which appeared to offer the greatest price/performance, was accepted. The superminicomputer selected offered close to 10 times the performance of our previous system.

A year later we are still waiting for delivery of some peripherals, mainframe features and systems software that was promised five months ago. The local sales and technical support people are no help. The sales people can't fill out

an order form properly and the technical field staff know less about the hardware and software than we do. We've gotten the turnaround so many times that we now try to solve the problems ourselves.

It is apparent that we made the wrong decision, but now we are committed. What can we do?

Given that you're committed to this vendor, you must begin to work with the vendor to resolve current problems and avoid future problems. No computer vendor wants this kind of customer dissatisfaction.

If the right person were to learn of your problems, the firm might very well take action to rectify the situation.

If you are convinced that you will not get satisfaction from the local office, write a letter to the national sales manager. Document every in-

stance in which you feel the vendor has acted unprofessionally or failed to live up to stated, written or implied agreements.

Such a letter will probably strain your relationship with the staff at the local office, but so be it. You will either be serviced properly by the existing staff members or by their replacements.

**Q** The phrase "by the book" was coined to describe the man I work for: Be at your desk by 8:30 in the morning; take no more than one hour for lunch; and above all, don't make waves. I've worked as a programmer-analyst for the last four years and until recently I have enjoyed plenty of creative license. Now the differences in the way I work and the way my new superoi-

sor wants me to work have resulted in a major personality clash. We don't like each other.

I continue to work hard and I get a steady stream of positive feedback — except from him. During a recent performance review, he rated me "poor" in five of the six performance categories. His supporting statements were laughable.

I would like to stay with this company for a while, but this review may have destroyed my future with the company. Should I contest his evaluation of my performance?

If you feel that you have been wronged and that you can build a solid case for a stronger performance review, by all means use the formal grievance channels to contest the results of your review.

No performance evaluation system can factor out a rating supervisor's personal bias against a subordinate. That is why most systems have checks and balances, one of which is that your supervisor's manager has to sign off on your evaluation. Typically this signature is a rubber stamp, except when the evaluation is contested.

If your current evaluation is grossly out of line with previous evaluations and you can document the quality and quantity of your recent work, you stand a good chance of having your ratings adjusted.

Over the long term, if you expect to stay with the company, the two of you will need to negotiate a working arrangement. This will involve some compromise on both parts.

**Q** We have eight personal computers in our public relations office, all of which are IBM Personal Computers or compatibles. Two of us set up the PCs, then trained ourselves and the others to use word processing, data base and spreadsheet software. We make good use of our personal computers, but we're certainly not sophisticated users.

We would like to network our personal computers so that we can share files, programs, data and a laser printer. Our data processing people are mainframe-oriented and have no experience in micro networking. Moreover, they show very little interest in helping us, even if we pay their internal fee of \$25 an hour. Do you think networking these PCs together would be too difficult a task for us to undertake?

"Difficult" is a relative term. More than one seasoned MIS professional has taken up primal scream while installing a PC network. If your knowledge is limited to a few DOS commands, then you may be in for a hard time. I don't mean to imply that you can't learn, but learning the specifics of PC networking poses a greater challenge than learning to use micro productivity software.

Before undertaking this task, I would suggest that you find a resource person to help you over the rough spots. Don't depend on any "free" help from the people who sell you the hardware and software.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 9171, Framingham, Mass. 01701-9171.

# BRING BUGS TO LIGHT



**WITH  
REALIA™  
COBOL  
ON A PC**

The fastest micro COBOL.  
The brightest interactive source debugger.  
IBM mainframe COBOL compatibility.  
Superb support.

10 South Riverside Plaza  
Chicago, IL 60606  
Phone: 312/346-0642  
Telex: 332979

**REALIA  
inc.**



# Business Acquisition.

In business, the smart money is spent in areas that improve the bottom line. Areas like productivity and efficiency. That's why a lot of companies today are investing their money in WordPerfect 4.1 for powerful business word processing.

## **Substantial dividends.**

With unsurpassed business features for the IBM PC and compatibles, WordPerfect 4.1 pays for itself again and again with professional documents turned out in record time. Features include an elegant thesaurus, 115,000-word spelling dictionary, columns displayed side-by-side on screen, math capabilities, split screen, and line drawing.

In addition, WordPerfect Corporation offers an excellent site licensing program so major

customers can receive the software and support they need for a pre-determined, discounted fee.

## **The top seller.**

With so much to offer, WordPerfect has now become the best-selling word processor for the IBM PC, according to market research firm Info-Corp. And customers like Merrill Lynch, Upjohn and General Dynamics are leading the way.

## **Maximize your investment.**

Get the word processor designed to improve your company's bottom line. WordPerfect 4.1. It's the perfect corporate investment. For more information, call or write WordPerfect Corp., 288 West Center St., Orem, Utah 84057, (801) 227-4000.

WordPerfect versions available for Apple IIe/IIc and Data General. Features and prices vary.

**WordPerfect**  
CORPORATION

A black and white photograph showing a hand holding a large, dark-colored software box. The box is angled towards the viewer, and the hand is positioned on the right side, gripping the top edge. The box has the 'WordPerfect' logo in a large, stylized font, with 'Word Processing Software' written in a smaller font below it. The background is plain and light-colored.

**WordPerfect**  
Word Processing Software



Someday, our children will be able to share information, anywhere, anytime and in any form as easily as we use the phone today. At Northern Telecom, we call this vision the Intelligent Universe,\* and we're already building telecommunications products to make it a reality.

Recently, the global telecommunications industry established a set of standards called Integrated Services Digital Network, to help guide the future of telecommunications.

In concert with you our customer, we're fully committed to applying the principles of ISDN. After all, these principles are but another step on the way to our vision.

**I**NTEGRATED—People in different parts of the world have different customs and speak different languages. That's because they were relatively isolated, and their cultures developed independently before the days of radio, television, telephones and fast, easy transportation. Sometimes, it's hard to communicate.

Similarly, computers and other equipment made by different manufacturers often find it hard to communicate, because they were developed independently and in isolation.

At Northern Telecom, we've been designing and building telecommunications products to help change this situation. The features and capabilities we have designed and the design information we make available to others let as many different kinds of products as possible connect and work together so they work better for you. We call a network which offers this kind of open interconnection an OPEN World.\*

**S**ERVICES—You don't need to understand what makes a telecommunications network tick to use it. For you, the network is just the communications services you need. And of course, the actual telephone or terminal you use is one means of accessing such services.

At Northern Telecom, we have defined and are building into the network a tremendous capability for the provision of services, and we have introduced a line of products to both access and realize this capability. We call it the Meridian<sup>®</sup> line of products. It's aimed at enhancing your communications effectiveness by offering you the services you need with the simplicity you demand. Meridian by Northern Telecom.





**D**IGITAL—Most people find that the best approach to solving a problem is the simplest approach. In telecommunications, the simplest way of carrying information is to convert it to a series of 1's and 0's—a digital bit stream.

A digital bit stream can mean anything—it can be your voice, a letter, a television picture, or the manufacturing diagrams for a new car.

At Northern Telecom, we've been designing and building telecommunications products based on the simple digital bit stream for two decades. We call a network that handles all information in digital form a Digital World.\*

**N**ETWORKS—In sports, a winning team starts with a good game plan, and adapts it in real time based on the changing flow of the game.

Up to now, telecommunications networks have followed a very static game plan. They were built mostly of separate elements to handle predictable changes in needs on a long-term basis. There was almost no way of controlling them in real time, so they provided little current information about overloads or breakdowns or anything.

At Northern Telecom, we have developed a new way of designing and controlling telecommunications networks. It's a game plan for public or private network architects who want to design and run their whole network like a winning team. It also lets networks carry different kinds of information more easily and economically and thereby provide the basis for supporting new services and capabilities for you.

We call it Dynamic Network Architecture.\*



**NETWORKING**



## MANAGEMENT



## CALENDAR

## JULY 20-26

**JULY 20-23, TORONTO** — **Directions at Toronto.** Contact: Cincom Systems, Inc., 2300 Montana Ave., Cincinnati, Ohio 45211.

**JULY 21-22, SAN JOSE, CALIF.** — **Computer-Aided Logistics Support.** Contact: Education Foundation of the Data Processing Management Association Seminars, Dept. CALS, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510. Also being held July 24-25 in Los Angeles.

**JULY 23-25, BOSTON** — **Micro-**

**trends '86, Education: Redirecting the Revolution.** Contact: Bobbi Hunt, International Communications Industries Association, 3150 Spring St., Fairfax, Va. 22031.

**JULY 23-25, MORRISTOWN, N.J.** — **Data Communications: Fundamentals and Beyond.** Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940. Also being held July 30 to August 1 in Los Angeles; August 6-8 in Anchorage, Alaska; August 13-15 in Boston; and August 20-22 in Indianapolis.

**JULY 24-25, ATLANTIC CITY** — **Integrated Logistics Support.** Contact: TTS Seminars, c/o Technology Training Corp., Dept. ILS/LSA, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510. Also being held July 28-29 in Orlando, Fla., and July 31 to August 1 in Washington, D.C.

**JULY 24-25, SAN FRANCISCO**

— **Advanced Communications Architectures Seminar.** Contact: Communications Solutions, Inc., 992 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129. Also being held August 19-20 in Washington, D.C.

**JULY 24-25, WASHINGTON, D.C.** — **EDI Training Session.** Contact: TDCC, 1101 17th St. N.W., Washington, D.C. 20036. Also being held August 21-22 and September 25-26 in Arlington, Va.

## JULY 27 TO AUG. 2

**JULY 27-30, BOSTON** — **Recognition Technologies Users Association Forum '86 Summer Session.** Contact: Recognition Technologies Users Association, P.O. Box 2016, Manchester Center, Vt. 05255.

**JULY 27-31, ANAHEIM, CALIF.**

— **Third Annual Information Center Conference & Exposition.** Contact: Information Center Conference & Exposition, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

**JULY 28-29, AVON, COLO.** — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

**JULY 28-29, BOSTON** — **Fast Algorithms Seminar.** Contact: Technology Training Corp. Seminars, Dept. FA, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510. Also being held July 31 to August 1 in Orlando, Fla., and August 4-5 in Washington, D.C.

**JULY 28-30, RENO, NEV.** — **1986 Summer Computer Simulation Conference.** Contact: The Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

**JULY 28-AUGUST 1, SAN DIEGO** — **Mapper Installation, Coordination and Support.** Contact: Computometrics Training Institute, P.O. Box 58383, Houston, Texas 77258.

**JULY 28-AUGUST 1, SEATTLE** — **Omnicom Week.** Contact: The Omnicom Institute, Omnicom, Inc., Suite 304, 501 Church St. N.E., Vienna, Va. 22180.

**JULY 30-AUGUST 1, AVON, COLO.** — **How to Build and Use a Data and Information Resource Directory.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

## AUG. 3-9

**AUGUST 4-8, ANN ARBOR, MICH.** — **Contemporary Data Communication Networks: Planning, Management and Computer-Based Design.** Contact: Engineering Summer Conferences, 300 Chrysler Center/N. Campus, Ann Arbor, Mich. 48109.

**AUGUST 4-8, FORT COLLINS, COLO.** — **Topics in Manufacturing Systems Engineering.** Contact: National Technological University, P.O. Box 700, 601 S. Howes St., Fort Collins, Colo. 80522.

## AUG. 10-16

**AUGUST 11-14, SNOWMASS, COLO.** — **AM/FM International Ninth Annual Conference.** Contact: AM/FM International, Suite 820, 8775 E. Orchard Road, Englewood, Colo. 80111.

**AUGUST 11-15, PHILADELPHIA** — **AAAI-86 Fifth National Conference on Artificial Intelligence.** Contact: AAAI-86, The American Association for Artificial Intelligence, 445 Burgess Drive, Menlo Park, Calif. 94025.

**AUGUST 14, ATLANTA** — **Buying and Selling Rights to Software, Hardware and Services.** Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015. Also being held August 15 in Philadelphia, August 18 in Boston and August 19 in Chicago.

## AUG. 17-23

**AUGUST 18-22, DALLAS** — **Thirteenth Annual Conference on Computer Graphics and Interactive Techniques.** Contact: SIGGRAPH '86, Conference Management, Smith, See CALENDAR page 84

# ECONOMIC ERGONOMICS.

Quimax personal computer monitors. More than just a pretty picture.

Compare Quimax to other leading monitors and you'll notice two important differences. With ours, you get more features for less money.

That's because every Quimax color monitor comes with 2 tilt and swivel base at no extra charge. Plus a large, 13" diagonal screen that makes viewing an absolute pleasure.

Then there are the important technical features. Like full IBM® compatibility. And non-interlaced scanning for flicker-free images. An image for every imaginable task.

Whether you're starting out or ready for CAD/CAM, there's a Quimax color monitor for you.

Our PX-IV, for instance, is a great value. You get professional-looking RGB color. Sharp 720 x 240 res-

olution. A .31mm dot pitch for high character definition. And a text mode that lets you switch from color to an easy-to-read green display for wordprocessing. There's also Color Graphics Adapter compatibility for 16-color graphics. But best of all, you won't have to spend a lot of green to get them.

For sophisticated graphics, the Quimax PX-22 high resolution monitor is the smart choice. EGA compatible, it features 64-color graphics. A .31mm dot

pitch. Automatic switching for EGA and CGA. An amber/green mode for text applications. And a maximum resolution of 720 x 350.

If ultimate performance is your goal, consider our new PX-32. It puts thousands of colors at your fingertips and displays them all with razor-sharp 720 x 480 resolution.

Install IBM's Professional Graphics Adapter in

your computer and the PX-32 supports CAD/CAM and other advanced engineering applications. Monochrome doesn't have to be dull.

Take our stylish DM-14. Its cabinet is 13% smaller than IBM's standard display. Yet its screen is 30% larger. With characters so clear you can stand back 10 feet and still read every word in amber or green.

And for superb monochrome graphics, there's our new DM-1400. It converts CGA graphics into stunning images of 16-shade amber or green. With up to an incredible 1,000 line resolution.

So before you buy a brand for its corporate image, consider the monitors that can do wonders for yours.

**Quimax**  
Quality and value  
with a twist.

Quimax Systems, Inc., 844 Del Rey Ave.  
Sunnyvale, CA 94086 Tel: (408) 773-8282  
INSIDE CALIFORNIA: (800) 232-8282  
OUTSIDE CALIFORNIA: (800) 228-0530

IBM is a registered trademark of International Business Machines Corporation.



# If the space program had advanced as fast as the computer industry, this might be the view from your office.



And space stations, Martian colonies, and interstellar probes might already be commonplace. Does that sound outlandish? Then bear these facts in mind:

In 1946 ENIAC was the scientific marvel of the day. This computer weighed 30 tons, stood two stories high, covered 15,000 square feet, and cost \$486,840.22 in 1946 dollars. Today a \$2,000 portable can add and subtract more than 20 times faster. And, by 1990, the average digital watch will have as much computing power as ENIAC.

The collective brainpower of computers sold in the next two years will equal that of all computers sold from the beginning to now. Four years from now it will have doubled again.

It's hard to remember that this is scientific fact, not fiction. How do people keep pace with change like this? That's where we come in. We're CW Communications/Inc. — the world's largest publisher of computer-related newspapers and magazines.

**Every month more than 10,000,000 people read one or more of our publications.**

Nobody reaches more computer-involved people around the world than we do. And nobody covers as many markets. In the United States we publish three computer/business journals. *Micro Marketworld* is published 24 times a year for businesses reselling small computer systems and software. *Network World* is the first and only newsworthy for users of data, voice, and video communications products and services. And *Computerworld*, the newsworthy for the computer community, is the largest specialized business publication of any kind in this country.

We also offer seven personal computer publications. *InfoWorld*, the weekly newspaper for people managing and purchasing personal computers for American business. The other six concentrate on specific personal computers: *PC World*, the comprehensive guide to IBM personal computers and compatibles; *inCider*, the Apple II journal; *Macworld*, the Macintosh magazine; *80 Micro*, the magazine for TRS-80 users; *RUN*, the Commodore 64 & VIC-20 magazine; and *AmigaWorld*, the magazine for the Commodore Amiga.

And we have similar publications in every major computer market in the world. Our network publishes over 60 computer publications in more than 25 countries — Argentina, Australia, Austria, Brazil, Chile, Denmark, Finland, France, Greece, Hong Kong, Hungary, India, Israel, Italy, Japan, Mexico, The Netherlands, Norway, People's Republic of China, Saudi Arabia, Singapore, South Korea, Spain, Sweden, Switzerland, United Kingdom, United States, Venezuela, and West Germany.

**The sooner we hear from you,  
the sooner you'll hear from our readers**

Simply put, we make it easy for you to reach your target audience — and for them to reach you. Call today for more information. You'll find the number below.



CW COMMUNICATIONS/INC.  
375 Cochituate Road, Box 9171  
Framingham, MA 01701-9171 (617) 878-0200



## MANAGEMENT

## Rise of end users brings challenge

From page 77

the future.

W. H. Groetzinger, director of Information Systems and Management Services at Rohm and Haas Co. in Philadelphia, says, "We're enthusiastic about end-user computing and doing what we can to support it. Employees are provided with a pretty full set of end-user tools at the mainframe, System/36 and PC levels."

Groetzinger uses the four classic stages of growth — initiation, proliferation, control and maturity — to describe the growth of end-user computing at his firm. Rohm and Haas, he says, is now in the control phase.



Fail-safe data communications

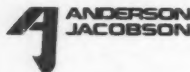
## Unattended auto dial back-up modems work when your leased lines don't.

When you need fail-safe data communication for your critical applications, you need AJ's unattended auto dial backup modems.

Models are available for 4800, 9600, and 14,400 bps. They continuously monitor the lines. When they sense carrier loss or degradation of signal quality, they automatically dial stored numbers and communications resume over the dial-up line.

They even automatically restore communications to the leased line when conditions improve.

For details on AJ fail-safe data communications send the coupon.



Please send FREE information on the following:

☐ AJ 4048-2 (4800 bps) ☐ AJ 9600 (9600 bps) ☐ AJ 1401 (14.4 kbps)

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Phone ( ) \_\_\_\_\_

Anderson Jacobson, Inc., 521 Charcot Avenue, San Jose, California 95131, (408) 435-8520.

"We don't think you can put requirements on what you permit people to do," he claims.

However, he is instituting a level of control by restricting the types of personal computers and software his group is willing to support.

Doug Norwood, manager of the Information Center for the City of Los Angeles, sees three trends from his

end-users: increased demand for micro-to-mainframe links, with the host used as a library; higher demand for graphics and associated printers; and more use of host-based products such as SAS, from SAS Institute, Inc., and Focus from Information Builders, Inc., which have risen fourfold in the past year.

Norwood's staff of seven serves a user community of about 1,500, of whom 1,000 have user IDs, and he receives many requests for new packages. However, he says caution is the key word when dealing with enthusiastic users hot for a new product. He suggests sticking with a basic set of PC software products: word processor, spreadsheet, data base and graphics.

"Unless you have a quantum leap in the technology, if it has a little

more whiz-bang, it won't be substantially better. There are a lot of look-alike products," he warns. "There's so much software out there to keep up with."

Yet he finds most of it is for micro. "We're not finding a great deal of advanced technology for data bases or spreadsheets on the host."

Each organization's end users

have their own individual and collective life cycles. As their needs continue to evolve, end users become more sophisticated and demand more from the information center.

"Six to nine months ago, everyone was happy with stand-alone Lotus 1-2-3 on PCs. Now they want data from the mainframe, to download, to transfer

to other PCs and to other sites," says Kathy Kilduff, manager of Honeywell, Inc.'s Information Technology Center in Waltham, Mass.

After installation and initial education, Kilduff's biggest problem is communications, linking the stand-alones.

One part of her solution is to write her own communications course for the end users. Education is a large part of what she does in the informa-

tion center, but she says staying abreast of changing user needs is critical.

"What worked last year won't necessarily work this year. We're refining our courses every quarter," Kilduff says. She finds users requesting increasingly advanced courses.

In order to sort out the plethora of microcomputer products, Kilduff is part of Honeywell's PC Council, which has an internal, nationwide software data base. She said the group has corporately licensed training tutorials for the most popular packages.

She also uses the services of Corporate Software, Inc. of Canton, Mass., which researches thousands of software packages each year and puts the top 400 in a reference book that information center managers can use to assist them in choosing the software most appropriate to their needs.

### Information centers

Information centers appear to be an effective method for MIS departments to manage end-user computing.

"A good responsive information center is the logical response to end-user computing," says James C. Wetherbe, a professor of MIS at the University of Minnesota and director of its MIS Research Center.

"Our research shows that a well-focused, competent information center staff can make all the difference in the world in enhancing the image of the MIS staff and supporting the user."

**"Six to nine months ago, everyone was happy with stand-alone Lotus 1-2-3 on PCs. Now they want data from the mainframe, to download, to transfer to other PCs and to other sites,"**

— Kathy Kilduff  
Honeywell, Inc.

CALENDAR from page 82  
Bucklin & Associates, Inc., 111 E. Wacker Drive, Chicago, Ill. 60601.

AUGUST 18-22, WALTHAM, MASS. — The Institute on Artificial Intelligence and Expert Systems. Contact: Joan Merrick, Seminar Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167. Also being held September 29-October 3 in Chicago.

AUGUST 19-20, NEW YORK — DEC: The Next Five Years. Contact: The Yankee Group, Seminar Division, 14th Floor, 89 Broad St., Boston, Mass. 02110.

AUGUST 19-21, PHILADELPHIA — Second Annual Physical and Electronic Security Symposium and Exposition. Contact: Michael C. Otten, Booz, Allen and Hamilton, Inc., 4330 East-West Highway, Bethesda, Md. 20814.

### AUG. 24-30

AUGUST 24-28, SAN FRANCISCO — The Third International Congress on Advances in Non-Impact Printing Technologies. Contact: Society of Photographic Scientists and Engineers, 7003 Kilworth Lane, Springfield, Va. 22151.

AUGUST 26-28, SAN MATEO, CALIF. — Interconnect '86. Contact: Agnes M. Pavel, Program Director, U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

AUGUST 27-29, NOORDWIJKERHOUT, THE NETHERLANDS — Information Systems Assessment. Contact: Stichting Informatica Congressen, Paulus Potterstraat 40, 1071 DB Amsterdam, The Netherlands.

## REACH OVER 40,000



## AUSTRALIAN COMPUTER PROFESSIONALS.

CW Communications covers the Australian market with four publications.

Each week, 12,000 MIS/DP executives read *Computerworld Australia* for complete coverage of computer technology in medium-to-large organizations.

*Australian PC World* is Australia's only newspaper dedicated to IBM-standard personal computing. 12,000 IBM PC owners and potential buyers read *Australian PC World* each month.

*Australian Macworld* is Australia's magazine for the Macintosh user community. It is published bi-monthly and has a circulation of 12,000.

*Communications World* is CW's newest publica-

tion reaching the Australian market. This bi-monthly publication covers telecommunications, office communications and network management, and has a circulation of 10,000.

CW International Marketing Services makes advertising your products in Australia, and around the world, easy. We have over 55 publications in more than 25 countries. For more information on our wide range of services, complete the coupon below and mail today.



Frank Cutitta, Managing Director  
International Marketing Services  
CW Communications/Inc.  
375 Cochituate Road, Box 9171  
Framingham, MA 01701-9171  
(617) 879-0700

Please send me more information on:  
☐ *Computerworld Australia* ☐ *Australian PC World*  
☐ *Australian Macworld* ☐ *Communications World*  
☐ Your other foreign publications  
Please send me a copy of your brochure entitled, "The Computer Marketplace in Australia"

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_



# So it's your job to find that one factory management system that will satisfy everyone in the company.



We know what it's like, trying to find a factory management system that'll meet everyone's needs.

It can be a real headache.

But before you consider doing anything drastic, consider MANMAN<sup>®</sup> from ASK Computer Systems.

It's a comprehensive, adaptable and fully integrated factory management information system.

Which means?

Which means that everyone in your company is going to like it.

Managers, for example, will find that MANMAN not only lets them control

and coordinate every MRP/II task, but virtually every function in the company.

From purchasing to payroll to field service. From controlling materials to controlling overhead.

For all the company's decision makers, there's DecisionMaker<sup>™</sup>. A great new MANMAN product that lets you set limits on over 80 key business indicators (from past due accounts to WIP inventory value), alerts you to when the limits have been exceeded and even shows you what action to take.

MANMAN will also appeal to every department supervisor.

Every foreman.

Every purchasing agent.

And everyone else in the company who has a special way of working that's already working.

MANMAN won't change that.

Its built-in "business policy variables" let you adapt the system to your unique way of doing business.

And its modular design lets you implement functions gradually or all at once (and once they're implemented, they're already integrated).

Finally, those who aren't used to computers—be they on the factory floor or in the executive suite—will quickly get used to MANMAN. Thanks to its easy conversation-style format, helpful help features, and a comprehensive user training program.

Maybe that's why, for more than a decade, MANMAN has been satisfying the needs of manufacturers all over the world.

And why we're the nation's leading independent supplier of factory management systems.

So if you've been agonizing over which system is best for your company, call us at 800-4-FACTORY.

And stop killing yourself.

---

**ASK**

*Making  
factory management  
manageable.*



## MANAGEMENT

## Data use gives competitive edge

From page 77

no magic inherent in any of these techniques that will assure success. They are basically one more means by which an organization can refine its planning process, refine its operations and try to beat the competition.

IFCA shouldn't be overblown in terms of its importance. It's just one more tool in the bag of tricks that any information systems manager has to better discharge his responsibilities.

**CW:** Who might initiate IFCA, and how should it be justified?

**FRIEDMAN:** There are really several starting points. Again, it varies with

organizational style. Where it has been most successful is where it has been driven by the executive office in conjunction with the business strategy or the equivalent of the chief information officer in conjunction with long-range information planning.

Those two starting points tend to take a fairly broad view of the company, its markets and its competition. Rather than starting with the notion that we have some neat technology and how should we use it, it's the other way around: We've got a business problem to solve, and what can we do with the technology to better enhance our position?

**CW:** What are the major obstacles that crop up in the implementation of these programs and projects?

**FRIEDMAN:** There are several. Just as all business strategies are not going

to be successful, not all information technology strategies are going to be successful. You have to overcome the unrealistic expectations of management that technology is somehow magical and that everything is going to be dramatically successful.

The second issue is technology, particularly when building competitive intelligence systems, for example. The success of those depends on the availability and accuracy of the information you're going to obtain. There are limitations on the data itself, the retrieval and the data base capabilities within the organization.

The third problem, particularly with the internal use of information for competitive advantage... is that once you build those [competitive intelligence systems] and make information available to the executive suite on a timely basis, you have now

dramatically shifted the balance of power within the organization. Once you provide information on-line to the executive suite, you've shifted power. The middle management ranks in the organization can find that extremely threatening if it isn't managed properly.

**CW:** What can the MIS manager do to bridge the gap to the executive office?

**FRIEDMAN:** It's all driven by the ability to use information to solve business problems. If the approach from the information systems manager to the executive suite is to say, "Gee, I have this really neat hardware, and here's what we can do with it," and you happen to have an executive who's not attuned to hardware, it will fall on deaf ears.

If the information systems manager takes the perspective, "We're using this resource to help with our business goals and strategies, and we're focusing on the needs of all of your users in the organization," you may or may not get the CEO to buy into the system, but you can typically find a number of user sponsors for

## International Marketing. If you've got the computer products, we've got the facts. And they're yours ... FREE!

Whether you're just beginning or expanding your international marketing efforts, CW Communications has gathered all the facts for you. And that means you'll save time, labor and money. Our market fact brochures, available to you free of charge, tell you what you need to know about computer markets in many countries around the world.

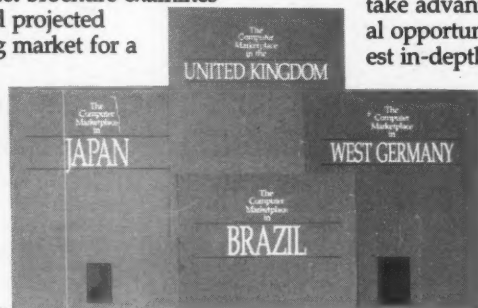
In fact, we've spelled it all out for you. Each market fact brochure examines the current and projected data processing market for a specific country, including software and services, hardware — from main frames to PCs —

and leading vendors.

CW Communications has the computer world covered. Our comprehensive data can help you make informed decisions about when and where you should embark on an international campaign.

If your company is currently involved in, or planning an international marketing program, you can benefit from our worldwide coverage. Be sure to

take advantage of this unusual opportunity and get the latest in-depth information on the international computer marketplace absolutely free!



CW International Marketing Services 375 Cochituate Road Box 9171 Framingham, MA 01701-9171 (617) 879-0700

Please send me the following brochures: "The Computer Marketplace in..."

- ☐ Argentina ☐ Japan ☐ S.E. Asia ☐ Mexico ☐ Australia ☐ Netherlands ☐ Brazil ☐ Italy  
☐ Denmark ☐ Spain ☐ Finland ☐ Sweden ☐ France ☐ United Kingdom ☐ Norway ☐ West Germany

Name \_\_\_\_\_  
 Title \_\_\_\_\_  
 Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ Phone \_\_\_\_\_

**"**  
*'If a competitor is able to use technology as a competitive weapon and you don't respond... you'll be held accountable to your shareholders sooner or later.'*

— Joel Friedman  
 Arthur Andersen & Co.

more advanced uses in technology.

**CW:** What about MIS managers today, some of whom may not want to get involved in the strategic aspects of information technology?

**FRIEDMAN:** The trauma of change. That's true with any kind of change, whether it's technology, product or marketplace. Yet if an organization doesn't respond to change, it's not going to survive. I think organizations will find themselves with very little choice.

If a competitor is able to use technology as a competitive weapon and you don't respond... you'll be held accountable to your shareholders sooner or later. If you're the individual who doesn't respond and you have a whole level of management beneath you that does understand better how to use technology, you'll become superfluous.

You've got to face up to change. There really is no choice. It's a question of how rapidly you do it, how rapidly your industry is changing, how rapidly your competitors are changing. But you have no choice.

So for the information systems manager who's finding himself frustrated today, there are a couple of messages. One is to keep the faith, because change is inevitable. Two is to find a coalition of supporters within the organization because there are going to be individuals in the organization who really see the use of technology and information and the competitive potential. I'm very optimistic about this change.



# Introducing NonStop VLX.

Tandem technology sets the new standard for large applications in on-line transaction processing.

More transactions per second at a lower cost per transaction than any system in the world.

## THE CIRCUITRY'S FAST.

We designed the system in our own laboratory, right down to our own unique VLSI chips. The result is more circuitry in less space. With fewer components than our next largest system, the VLX delivers twice the performance and three times the reliability.



## PROCESSORS WITH LARGE APPETITES.

The VLX processors move transactions in 32-bit chunks. They reach into main memory in 64-bit chunks. Because this happens in parallel, more work gets done in less time at a lower cost per transaction.

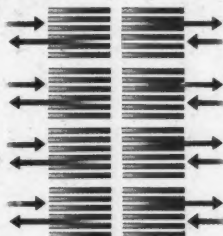
## THE SERVICE IS EASY.

All critical components are field replaceable. When service is required, it's faster. You don't even have to stop an operation to add or replace components.



## THE DATA EXPRESSWAY.

In a conventional database, I/O requests must be handled sequentially. This creates queues that slow response time. In the VLX system, there are multiple paths to multiple disks. Data enters and leaves the database simultaneously. No time is wasted, and all disk space gets used.

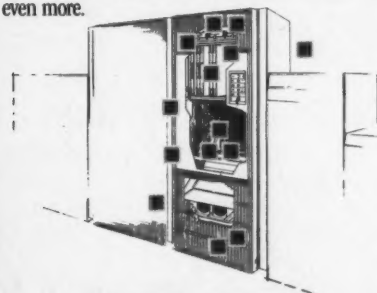


## DIAGNOSTICS FROM A DISTANCE.

An integrated microprocessor allows us to monitor the system environment from anywhere in the world. We can even run stress tests remotely. If a failure does occur, the VLX has the capability to automatically dial out to remote centers anywhere in our worldwide network.

## THE SYSTEM KNOWS THE SYMPTOMS.

Expert systems software, using fault analysis, directs the problem diagnosis systematically. It also allows us to analyze it and shorten service time even more.

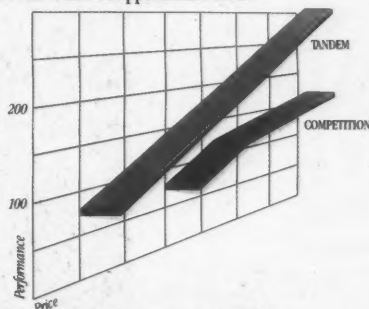


## SECRETS ARE SAFE.

We offer software that will protect the security of your data whether it's in the VLX, in another Tandem system or in transmission.

## NO GROWING PAINS.

To add power, just add processors. You can grow from a base four-processor system to 16. From there, you can expand in whatever increments you choose, all the way to 255 systems. You never buy more than you need, and you'll never have to rewrite a line of applications code.



## NO-FAULT INSURANCE.

Tandem systems achieve fault-tolerance with a unique, parallel processing architecture. There are no idle back-up components. Instead, multiple components share the workload. If one goes down, the others pick up the slack, and application processing is uninterrupted.

## HERE TODAY. HERE TOMORROW.

The VLX is compatible with any Tandem system and with all major communications standards — SNA, X.25, MAP and O.S.I. And by acting as a gateway to other vendors' systems, the VLX can link them and enhance their value as well.

## WE HAVE EXCELLENT REFERENCES.

Tandem systems are already at work for Fortune 500 companies in banking, telecommunications, manufacturing, transportation, retailing and energy, as well as several branches of the U.S. Government.

To find out what we can do for you, call 800-482-6336 or write to us. Corporate Headquarters: Tandem Computers, Incorporated, 19191 Vallco Parkway, Loc. 4-31, Cupertino, CA 95014

**TANDEM COMPUTERS**



## MANAGEMENT

## Information's liabilities

From page 77

common law, according to Marx, a partner in the Goulston & Storrs law firm in Boston. "You start from a basic premise of Anglo-American law that people are responsible for their wrongs to others if they have some kind of a 'duty of care' toward them," Marx says. But what constitutes duty of care is not clear-cut.

For example, a company that claims to sell a word processing program has a duty of care to provide that product. If the program actually is not a word processor but only a text editor, the customers who bought the package expecting word processing services could win a lawsuit, because they clearly ended up with something other than what they expected.

The vendor is under legal obligation to provide what it says it provides — in this case, word processing software.

On the other hand, nobody can hold the U.S. Weather Service responsible for ruining their picnic if the service said it would be a sunny day and it rains, Marx says.

"If I was going to be a guest at your picnic, which you planned on the weather service forecast, and it rained, and I sued, I would not win," he explains. "That is clearly so removed there is no duty of care."

### Shades of gray

But between those two extremes are many gray areas, Marx says. Often, informational services are mislabeled as products, a legal technicality that can make a world of difference, Marx says.

"Traditionally with services, you had to have been negligent in order to be held liable," he says. With products, there is strict liability, whether or not the provider was negligent.

However, marketing departments often package services as a product so that the customer thinks he is getting something tangible, he adds.

Steps that smart managers can take to reduce chances of being held responsible start with an awareness of how the service they provide is being marketed, Marx says. Managers should ensure that the capabilities of the service or product are not being exaggerated.

In addition, managers should think about the effects of their service or product on third parties as well as on the direct customer. This is particularly true when lives or large sums of money are involved, Marx says.

Quality control is important, Marx says. "If the data

you are dealing with may have serious consequences — such as the data used in disease control or aircraft control — there should be redundancies."

Two clerks could separately enter critical information and if discrepancies result, a supervisor should check the data to see why it is different.

Companies should sign contracts with suppliers and customers to shift responsibility wherever possible,

Marx continues. "Jeppeson could have had a contract with the aircraft owner saying the owner was responsible for whatever happened to the plane."

At the time of the World Airways disaster, it was not possible for a company to sign such a contract with government agencies. But Jeppeson later helped push legislation through Congress so that now a company can contract to shift responsibility for mistakes that are sole-

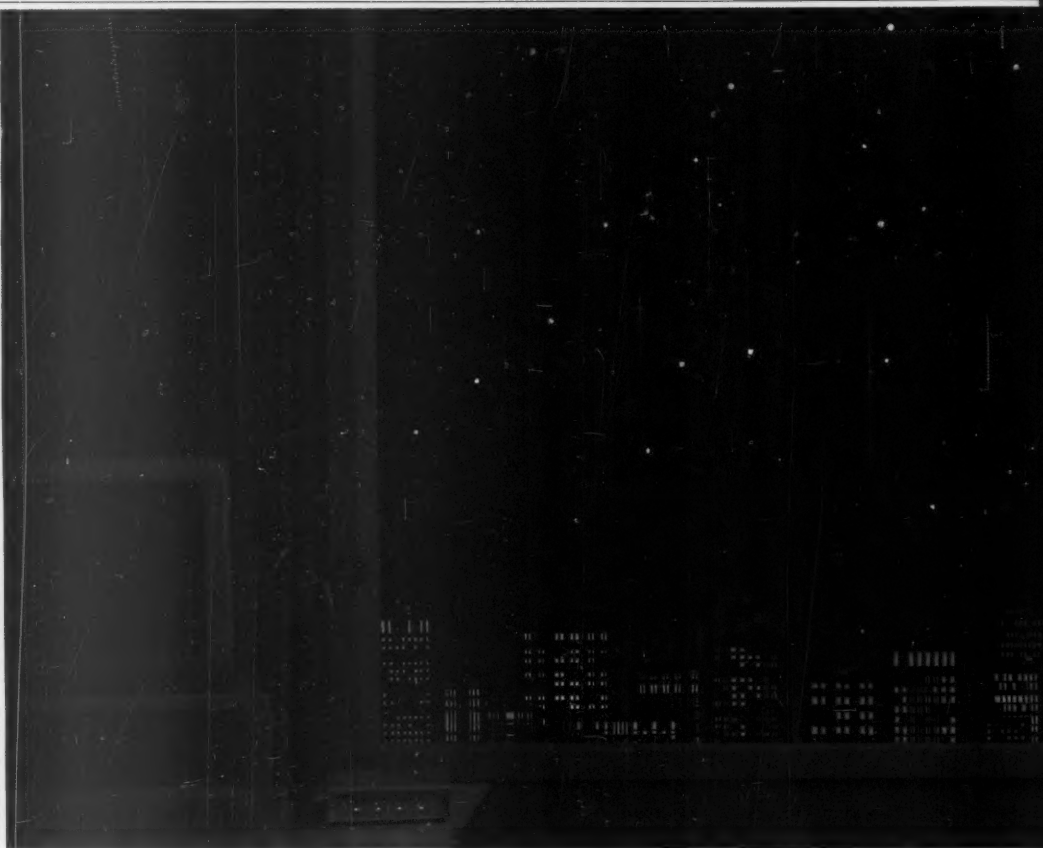
ly the government's fault.

"When important decisions are made, they should be recorded," Marx says. Internal records should be complete, documenting all the considerations that went into deciding whether a product or service was safe.

Records should cite all efforts that were made to ensure safety and to improve the service or product, so that if there is a lawsuit, there is a formal record of company responsibility and

not a lot of "smoking guns" — informal memos that work against the company.

The information manager should know how the company's insurance policies protect himself and his staff. "How much do the insurance companies cover MIS activities? Do they cover MIS executives personally?" Marx asks. If there is a duty of care that extends to individual employee's responsibility, it might be wise to have that employee well covered.



# We Can Transport You Very Own

You'll be light years ahead in data communications with a Siecor fiber optic star system for your LAN. Because, our Ethernet-compatible star system stems from extensive fiber optic experience. We've designed and made hundreds of reliable fiber optic prod-

ucts. And pioneered many significant advancements.

Siecor Ethernet products can create a backbone for your LAN, connecting multiple coax Ethernet segments and extending node separation to 2.5 km. If a harsh environment is your prob-

lem, we have an all fiber optic solution. And we can remotely link your building with point-to-point optical connections via bridges and repeaters.

Siecor can design, install and test your system. And serve as your single source for



## MANAGEMENT

## Making MIS a profit center

From page 77

The group first researched prevailing market rates of outside service bureaus. They then consolidated the quotes and averaged them. From the averaged rates, they subtracted 25% to arrive at a rate far below market value.

The new rates were proposed to management for use in evaluating the distribution and effectiveness of MIS resources. When management agreed the proposed rates were more than fair and should be used, the MIS group created a competitive revenue stream for funding its operations.

The group then had to determine how much of the revenue should be invested in MIS. It also had to determine how much should be

returned to the corporation.

It created a profit-and-loss plan and statement of assets. Management agreed to achieve the same return on its MIS assets as on others. The target return, when subtracted from the revenue, yielded the MIS budget.

The user departments thus absorbed charges from MIS as expenses in their operations. Each user matched his portion of MIS expenses to his ability to generate revenue or to control costs. Es-

entially, investment judgments in MIS were passed on to users.

This process is analogous to transfer price mechanisms used in large manufacturing organizations, which measure performance at each plant contributing to the end product. Likewise, data processing and information services are two of many corporate resources used to produce an end product.

At the utility company, top management changed its

perception of the MIS department. Rather than a drag on overhead, it was seen as a vital contributor to the company's earnings. The MIS executive gained stature and became more involved in business decisions.

Nevertheless, there are pitfalls in establishing MIS as a profit center. If objectives are not well defined, the concept might lead to disastrous results. Profit-oriented MIS and user managers might squeeze out vital services such as security and disaster recovery as a result of short-term profit maximizing. The corporation might have to fund any MIS activity that doesn't have short-term benefits to users.

Profit centers favor high-volume, complex applications such as on-line systems. These are used by a limited number of business groups and generate very profitable revenue. On the other hand, applications such as time-sharing are less complex, use fewer resources, and are far less profitable.

Time-sharing may use large amounts of MIS resources, but this is spread over many users. When a profit-oriented MIS group favors more profitable transactions, service may suffer for others, even though that is at odds with business objectives.

The solution to matching service to business objectives lies in changing the way MIS professionals are paid and rewarded.

### Motivation obstacles

At an Information Group executive roundtable, MIS managers complained about personnel departments and restrictive salary systems, such as the odious Hay Point program, because these systems create obstacles to motivation.

When MIS professionals are paid and rewarded under obsolete and bureaucratic systems, there is little hope for aligning them with business objectives. Executives at the roundtable felt that in addition to changing the method of assessing MIS performance, jobs and reward systems should be restructured.

That is easier when they can be based on an identifiable MIS contribution such as return on investment.

Finally, MIS executives in charge of a profit center need to be involved in the business of the organization more than ever to optimize the results of the new MIS business unit.

If the profit center views itself as an independent business, it might turn away from day-to-day involvement with the organization it serves. Running an MIS unit as a profit center should enhance its stature in the organization, not alienate it.

# At Light Speed To Our Star System.

a full range of fiber optic products. Like optical transceivers with built-in CD Star couplers and wiring centers. Fiber optic cable. And Collision Detection Electronics which offer added protection as well as the flexibility to upgrade. And it's all in

compliance with Ethernet.

If you'd like to install and test optical and coaxial transceivers yourself, Siecors Portable Ethernet Transceiver Tester can help. And it can verify compatibility with IEEE 802.3 standards.

So make a quantum leap

in data communications.

Contact Siecors Corporation, Electro Optic Products, P.O. Box 13625, Research Triangle Park, NC 27709-3625. Telephone 919/549-6571.

## SIECOR



# AT&T IS IN RAPID-FIRE DATA.

For high-speed bursty transmissions of crucial business data among multiple locations here and internationally, you simply cannot afford system errors and inefficiencies.

That's why AT&T has developed AT&T ACCUNET® Packet Service. A software-controlled, public switched packet data network designed for exceptional reliability, availability and price performance.

Consider this: AT&T ACCUNET Packet Service has a grade of service objective of a remarkable P001.

And at the highest access line speed of 56 kbps with full 128-octet packets being transmitted over simultaneous 9.6 kbps logical channels, ACCUNET Packet Service's average delay is a mere 200 ms.

Automatic alternate routing and back-up switches also help to assure you of continuing system reliability.

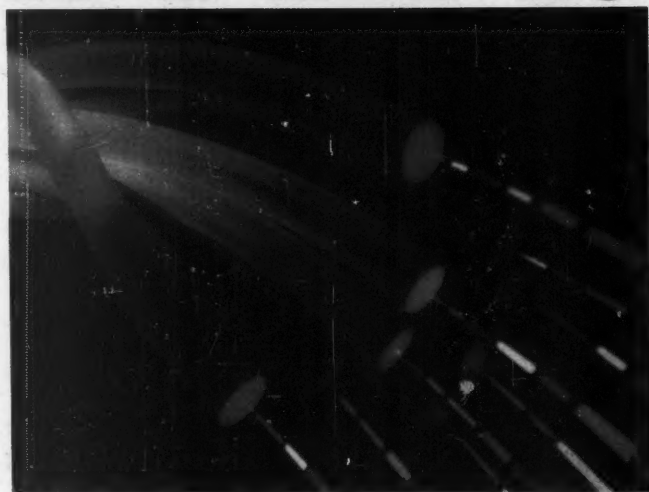
In fact, our packet service is designed to be available 99.5% of the time.

What's more, ACCUNET Packet Service is available 7 days a week, 24 hours a day through access points in 99 U.S. cities.

ACCUNET Packet Service also offers you flexibility, through either dedicated or dial-up\* access.

Internationally, you can connect with a common user, overseas packet switching networks on a cost-effective basis for transmissions with high throughput, low error rates and fast response times.

AT&T ACCUNET Packet Service is currently available to Canada, Japan, England, France and Italy, with other countries to be added on this year.



*Imagine 40,000 car reservations in packetized bursts of data with almost instantaneous network response on AT&T ACCUNET Packet Service.*

All of which supports a wide range of interactive data applications on a global scale. From credit-checking and point-of-sale to data base search, information retrieval and electronic mail.

AT&T ACCUNET Packet Service, part of the AT&T ACCUNET Family of Digital Services. Another reason to choose AT&T.

For more information, talk with your AT&T account executive. Or call one of our sales specialists at 1 800 222-0400.





# NEW PRODUCTS

## Page reader eliminates rekey need

Compuscan, Inc., of Fairfield, N.J., has introduced the PCS Model 235 personal computer-compatible page reader.

According to the vendor, the PCS Model 235 eliminates the need to rekey information contained in correspondence, reports and files.

It is said to be able to scan a typewritten page of text or data and input the information, properly formatted, into IBM Personal Computers and compatibles in 30 sec. or less.

### Automatic features

Priced at \$3,150, the page reader is said to automatically stack-feed up to 50 pages while unattended, read popular office type styles and automatically add proper formatting codes.

It also comes with an interface for most word processing software packages such as Micropro International Corp.'s Wordstar and Wordstar 2000, Ashton-Tate's Multimate, IBM Displaywrite, Samna Corp.'s Samna Word and Volkswriter Deluxe and Wordperfect Corp.'s Wordperfect.

According to a company spokesman, the PCS Model 235 supports word processing, data communications, document distribution, electronic mail, data base creation and electronic filing applications.

He added that the scanners were designed to solve the problem of bottlenecks caused by an increasing amount of paper-based information that, without the scanners, would need to be manually keyed into personal computers, word processors and other office systems.

The PCS Model 235 is Compuscan's second personal computer-compatible page reader.

The company's PCS Model 230, introduced last fall, costs \$5,695. It has the same features as the PCS Model 235 with the added capability of being upgradeable to connect with dedicated word, communications and data processors.

The company also offers the Model 220 PCS Scanner that was designed to operate specifically with dedicated word processors such as those offered by Wang Laboratories, Inc. and IBM.

## Desktop 9-track streaming drive boasts small footprint

A desktop 9-track streaming tape drive with a small computer systems interface (SCSI) has been released by the Qualstar Corp. of Canoga Park, Calif.

Called Ministreamer Model 1054, the tape transport is said to be IBM and American National Standards Institute (ANSI) compatible, using standard 1/2-in. tape on a 10 1/2-in. reel. The Ministreamer is priced at \$3,995.

With Ministreamer Model 1054, users can select densities of 1,600 and 3,200 bit/in. Tape streaming speeds are 50 and 25 in./sec., respectively.

According to Qualstar, one of the major advantages of the system is its small size. The drive measures 12 1/4 in. by 21 1/4 in. by 8 1/4 in. It weighs 31 lb. and does not require a separate equipment rack for mounting.

The surface area required for the drive is said to be about the same as for an 8 1/2-by 11-in. piece of paper.

The SCSI interface is said to simplify the software integration of various peripherals on a common bus.

pherals on a common bus.

The SCSI controller in each of the Ministreamer drives provides the system with the drive's parameters and makes it possible for one software driver to control a number of different peripherals.

### Features microprocessor technology

According to a company spokesman, the Ministreamer features microprocessor technology designed to control tape motion and eliminate tension arms.

Qualstar manufactures and markets a family of ANSI- and IBM-compatible 9-track, streaming tape drives, including 7-in. and 10 1/2-in. drives with Pertec Peripherals Corp./Cipher Data Products, Inc., IBM Personal Computer and SCSI interfaces.

The company also supplies a tape subsystem for the IBM Personal Computer XT and AT that allows the user to interchange data files with virtually any mainframe computer, the vendor said.

## Tool enables RM/Fortran users to develop graphics applications

Ryan-McFarland Corp. of Rolling Hills, Calif., has announced that RM/Fortran IBM PC- DOS users can now develop graphics applications using Graphics Software Systems, Inc.'s GSS-CGI-based Graphics Development Toolkit.

According to the vendor, RM/Fortran programmers using the Graphics Development Toolkit's GSS-GCI raster technology can now develop applications featuring pop-up menus, windowing and high-quality text fonts.

GSS-GCI is said to be the first true device-independent computer graphics interface for raster and vector graphics.

### RM/Fortran applications

It enables RM/Fortran applications to be decoupled from hardware dependencies and eliminates the need for applications developers to create device drivers of graphics algorithms.

The GSS Toolkit is said to support a wide range of I/O devices, such as the IBM Enhanced Graphics Adapter and other IBM peripherals, as well as devices from Hewlett-Packard Co., Epson America, Inc., Okidata Corp., Ricoh of America, Toshiba America, Inc., Hercules Computer Technology, Inc. and Mouse Systems Corp. systems.

Designed to support the migration of high-end Fortran applications, RM/Fortran is a complete implementation of the Fortran-77 standard, certified error-free by the General Services Administration at the highest possible level.

IBM markets RM/Fortran Version 1.0 as IBM PC Professional Fortran for its engineering and scientific series of machines, the vendor said.

The price of RM/Fortran is \$595, and the price of the GSS Graphics Development Toolkit is \$395.

### INSIDE

Software  
& Services/92

Microcomputers/95

Communications/99

Systems  
& Peripherals/100

Price  
Reductions/102

## TRT interface lets VAX, IBM minis access telex network

### Offers accountability, internal message ID

TRT Telecommunications Corp. of Washington, D.C., is offering telex interfaces for users of IBM System/34, 36 and 38 computers and Digital Equipment Corp. VAX minicomputers.

The telex interfaces for IBM System/34, 36 and 38 and VAX provide menu-driven access to the worldwide telex network and enable users to send messages to other private or public networks, using TRT as the gateway.

Access to TRT is available via a 1,200 bit/sec., 2,400 bit/sec. or 4.8K bit/sec. dial-up connection. The procedure of message processing on the interfaces consists of the user creating or revising his message with the telex editor, placing the message on the transmission file and letting the system automatically transmit the message.

According to TRT, full message accountability is ensured, either via a message log that is continually updated on the IBM System, or — with both the DEC VAX and the IBM System/34, 36, 38 — through a TRT acknowledgement number, delivery notice and message text at the sender's

workstation or printer.

In addition, both systems are said to allow for the assignment of an internal message identifier, enabling users to keep separate files on messages by project name or by department.

Both TRT interfaces provide for outgoing message control and routing through a supervisor. Messages leaving the system are created and delivered to TRT for telex transmission from the user's workstation.

Messages coming into the system from domestic and international points are automatically distributed directly to the correct end user on the system.

The fully paid license for the interface, including system software and autodialer hardware and software, costs \$4,500 for the IBM System/34 and 36 and \$5,500 for the System/38. A maintenance option is available for \$40 per month. For the DEC VAX, the permanent license costs \$2,700.

A one-year license with option to convert is available on the IBM System/34 and 36 for \$228 per month and on the System/38 for \$269 per month, maintenance included.

According to a company spokesman, if the user wishes to convert from a one-year license, he can use 65% of payments already made as payment toward the new license.



## NEW PRODUCTS/SOFTWARE &amp; SERVICES

## SOFTWARE &amp; SERVICES

## Systems software

Cosmic has announced **Expert System Executive**, a computer program for use in automated real-time monitoring.

When provided with a set of rules and real-time data, the Executive continuously compares the current status to the rule conditions, determines which rules are applicable and performs the required action. It has three major data principles: an array containing the rules, an array containing the conditions and the queues containing the conflict set.

The program is written in C for use on a Hewlett-Packard Corp. 9000 series computer.

Expert System Executive costs \$500.

Cosmic, Computer Services Annex, The University of Georgia, Athens, Ga. 30602.

Genesys Software Systems, Inc. has enhanced its **Human Resource Managers and Staff (HRMS)** system software by including an English/French language capability.

The HRMS program includes Payroll Accounting, Personnel Administration and Benefits Management. Either French or English may be selected at logon, and all menus, data entry, data inquiry and system screens appear in that language. A user can switch between languages

without having to sign on again.

HRMS runs on IBM mainframes under OS or DOS.

The enhancement costs from \$32,000 to \$65,000 for individual modules. The complete system costs from \$111,000 to \$355,000.

Genesys Software Systems, 20 Ballard Way, Lawrence, Mass. 01843.

Hewlett-Packard Co. has introduced its **HP 64000-UX** microprocessor development environment.

The product is said to provide connectivity and compatibility with host computer environments. It offers such capabilities as an open system with versatile networking to microprocessor software development environments such as Digital Equipment Corp. VAX and IBM Personal Computers, in-circuit emulators, and analysis tools for 8-, 16- and 32-bit microprocessors and HP computer-aided software engineering tools that address the entire microprocessor software design cycle.

HP 64000-UX costs \$6,500.

HP, Inquiries Manager, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Convex Computer Corp. has announced that Quantitative Technology Corp.'s **Math Advantage Software** is now available for use with Convex's C-1 supercomputer system.

The Convex Math Advantage consists of 176 engineering and scientific

subroutines. The subroutines are said to provide functions used in signal and seismic processing, mechanical design and scientific computing.

Convex Math Advantage costs \$10,000 in executable form. The source code costs \$15,000.

Convex Computer, 701 N. Plano Road, Richardson, Texas 75081.

IMSL has released the **IMSL Library** for Pyramid Series 900 systems using the Fortran 77 compiler, under the OS operating system.

The IMSL Library is said to provide over 500 mathematical and statistical Fortran subprograms for the professional problem solver. The IMSL library subroutines are divided into three categories: mathematical, statistical and general applications.

The IMSL Library's annual license fee on the Pyramid 900 systems is \$2,500 for the first year and \$2,000 for a renewal.

IMSL, 2500 City W. Blvd., Houston, Texas 77042.

Apollo Computer, Inc. has introduced its **Domain/Performance Analysis Kit (PAK)**, a set of computer-aided software engineering tools.

Domain/Pak consists of the The Domain Performance Analysis Tool, said to refine performance data down to the procedure level; the Display Process Status, used to learn how an application as a whole shares system level resources; and the Histogram

Program Counter, used to obtain a detailed look at execution time within a given procedure.

Domain/PAK costs \$250 per node and \$980 per site.

Apollo Computer, 330 Billerica Road, Chelmsford, Mass. 01824.

## Applications packages

**Manufacturing and Consulting Services, Inc.** has announced the availability of its **Anvil-5000** computer-aided design and drafting and computer-aided manufacturing software to run on the IBM RT Personal Computer.

Anvil-5000 is said to integrate wire frame, surface and solid modeling, finite element mesh, drafting and numerical control into a single package using the same data structure and the same interactive interfaces.

Anvil-5000 workstation licenses range from \$5,000 per workstation to \$19,000 per workstation for 12 workstations.

Manufacturing and Consulting Services, 9500 Toledo Way, Irvine, Calif. 92718.

## Languages

Whitesmiths, Ltd. has announced **Version 2.3 of C/370**, its C compiler for the IBM mainframe environment.

C/370 enables the development of C programs in the IBM mainframe environment and allows software developers to port existing applications to the IBM 370.

The major enhancement in Version 2.3 is the addition of the **Continued on page 94**



## How to give them complete hands-on training without them getting their hands on your mainframe.

**Introducing MENTOR/IMS**  
the unique, fully-featured  
IMS/VS master terminal  
simulator that runs on  
an IBM PC or compatible.

Mentor/IMS is the first and only software package to provide full IMS/VS operator training, operational recovery procedure, rehearsal and error situation simulation, without interfering with your mainframe systems. Completely flexible, it customizes to your own transaction codes, database names, logical terminal names, etc. to create a uniquely cost-effective and safe training and diagnosis tool.

Mentor/IMS supports all operands of all IMS/VS master terminal commands and behaves and responds exactly like a normal IMS/VS MTO terminal. All types of IMS/VS restart are simulated and full support is also provided for unsolicited and random events, such as system checkpoints, transaction abends, execution of BMPs, etc.

Created by Span Software Consultants, who have an impressive, 10-year record of mainframe software success all over the world, Mentor/IMS is developed and supported to the highest standards, with maintenance and upgrades for new IMS/VS releases and features assured.

Quite simply, it means that now, with just a personal computer, you can totally separate training from your mainframe system, provide self-study and revision facilities, and give genuine experience and disaster recovery training without risk or inconvenience.

To find out just how easily and effectively you can do it, call us now for our

FREE Mentor/IMS demonstration diskette or mail us your business card or letterhead to the address below.

**FROM NORTH AMERICA CALL:**

**011-44-925 814444**

(Don't worry about time zones we'll be waiting on your call!)

**Span Software Consultants Limited,**

The Genesis Centre, Birchwood Science Park, Warrington, Cheshire, England. Telephone: U.K. 0925-814444. Telex: 627142 SPNSOFG.

**AUSTRALASIA: Software Developments Pty Ltd.,**

845 Pacific Highway, Chatswood, N.S.W. 2067, Australia.

Telephone: (02) 411-7200. Telex: AA 73649.

# MENTOR/IMS

**THE WORLD'S FIRST PC IMS/VS SIMULATOR.**



IBM System /36 users.

# Make this phone call or you'll never know what increased main storage can do for you.

If you want 512Kb or 256Kb memory cards for your IBM™ System/36, your choice is simple.

Wait for IBM to deliver its newest feature.

Or call EMC and get immediate delivery.

## Why you need more main storage in the first place.

Insufficient main storage is the single biggest limitation on the performance of your System/36.

That's because every user, application and peripheral requires main memory.

By simply adding more main storage, you automatically speed up response time and improve productivity.

## What makes EMC add-in memory better.

To start with, EMC's new 512Kb and 256Kb memory cards utilize 256K RAM technology. Our 256Kb card, for example, has almost 50% fewer components and interconnections than IBM's. So it's inherently more reliable and consumes less power.

What's more, every single EMC memory board undergoes a rigorous 100-hour test and burn-in procedure in one of our own System/36's.

Our quality control pays off, too. For thousands of IBM users who rely on our memory for even their most critical applications.

## We've installed more memory in IBM minis than any other independent supplier.

Our customers include leading Fortune 500 companies, such as Allied Bendix, Equitable Life, Campbell Soup Company, GTE and Bank of New York, to name but a few.

And the list is growing longer every day. For obvious reasons.

EMC is the only manufacturer of add-in memory to offer you an *unconditional lifetime warranty*.

And EMC memory boards are 100% compatible with your System/36. They fully support all IBM memory and memory diagnostic routines—and do not affect your IBM maintenance agreement in any way.

Better yet, EMC's new 512Kb and 256Kb memory is priced a full 25% less than IBM's comparable memory. Our volume discounts and trade-up credits can make your savings even greater.

## 100% money-back guarantee.

If you're not 100% satisfied with your EMC memory for any reason, simply return the board within 30 days and we'll refund 100% of your money. No questions. No hassles. And of course, no waiting.

To place your order for immediate delivery—or for more information—just call the toll-free number below today. Or mail the coupon to: EMC Corporation, 12 Mercer Road, Natick, MA 01760.

To order or for more information, call today:

**1-800-222-EMC2**  
(In MA, call 617-655-6600)

YES, I'm interested in EMC memory for my System/36.

For Model(s) \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_

Phone \_\_\_\_\_

Mail to: EMC Corporation, 12 Mercer Road, Natick, MA 01760. CSM-7-14

# EMC<sup>2</sup>

No one is more committed to memory.

European Headquarters: In London (080385) 2434,  
International Number: 44 88 385 2434.  
In West Germany: 089 230 35266. U.S. TELEX 448625

EMC is a registered trademark of International Business Machines Corporation.



## NEW PRODUCTS/SOFTWARE &amp; SERVICES

Continued from page 92

2.3 is MVS/XA support, which allows C programs to reside anywhere in the 2G-byte address space available under MVS/XA.

It supports arrays larger than 16M bytes. Other new features include improved command line parsing and the ability to use 8-char. external names.

C/370 costs \$5,000.

Whitesmiths, 97 Lowell Road, Concord, Mass. 01742.

#### Utilities

Teradyne, Inc. has announced its **Automated Remote Control (ARC)** software.

ARC is said to permit the setup, monitoring and troubleshooting of A300-Series Analog Large-Scale Integration Test Systems anywhere in the world from a terminal of the Test System Director (TSD), the host computer of Teradyne's Teranet automatic test equipment networking system.

From a TSD terminal working with the ARC software, users can load, set up and run test programs; debug test programs; calibrate a tester; and send test data to a line printer or to the host computer for storage.

ARC costs \$30,000.

Teradyne, 321 Harrison Ave., Boston, Mass. 02118.

**Eurosoft International, Inc.** has announced **Macnix**, a software package said to provide Unix users with an interface to Apple Computer, Inc.'s Macintosh.

Macnix takes advantage of the Macintosh terminal to perform graphics operations. The host mainframe provides storage and multiuser support.

Macnix is said to be a unified virtual file system defined by the Unix files plus the Macintosh's diskette. The mainframes supported include Digital Equipment Corp.'s VAX, Sperry Corp.'s Personal Computer IT, NCR Corp.'s Tower and AT&T's 3B2 and 3B5.

Macnix costs from \$1,000 to \$7,500.

Eurosoft International, 14082 Loma Rio Drive, Saratoga, Calif. 95070.

**Talaris Systems, Inc.** has released **Version 2.1** of its **Laserplot** graphics support software.

Laserplot Version 2.1 is said to provide users with easy access to Talaris' 2400, 1200 and 800 laser printers' plotting capabilities. It offers a user-callable subroutine library written in Fortran 77 for developing graphics, filters that permit users to convert graphics from device or software-dependent formats to the Talaris laser printer

format and interfaces to other graphics packages.

Laserplot Version 2.1 is priced at \$1,700.

Talaris Systems, P.O. Box 261580, 5160 Carroll Canyon Road, San Diego, Calif. 92126.

**Maersk Data, Inc.** has introduced **MD-Slide**, said to allow direct connection of Hewlett-Packard Co.'s 7510 Color Film Recorder to IBM

mainframes using IBM's Graphical Data Display Manager (GDDM) graphics.

MD-Slide is a resident system program that converts GDDM/Admprint files to HP's graphics language commands and replaces the existing file with the new file. The Maersk Data spool system then sends the graph to the HP 7510 connected to the controller with a protocol converter. If the user wants to change the font, palette or background, entry into a full-

screen program allows the manipulation of backgrounds and palettes.

MD-Slide costs \$7,500.

Maersk Data, 25 Vreeland Road, Florham, N.J. 07932.

#### Training software

**Comprehensive Software** has added the **Introduction to Electronic Spreadsheets** to its Intro series of training software for IBM Personal Computers and compatibles.

The program is said to ex-

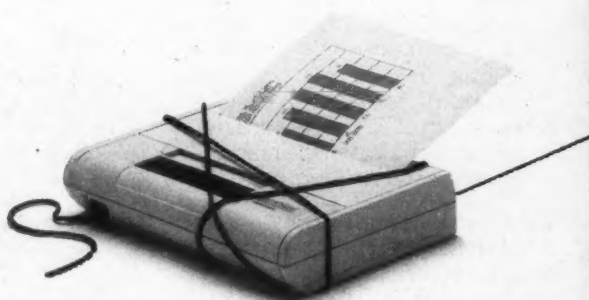
plain what spreadsheets are as well as providing background for determining their needs. It features Lotus Development Corp.'s 1-2-3.

Topics include creating work sheets, functions, formulas, ranges, macros, data bases, graphics, cross-checking, combining work sheets and design principles.

Each of the five products in the series costs \$59.95.

Comprehensive Software, Suite G, 2316 Artesia Blvd., Redondo Beach, Calif. 90278.

## The new Diconix 150. At under four pounds. It's the one PC printer you can





## NEW PRODUCTS/SOFTWARE &amp; SERVICES

**Software Express** has released its **Operator Training Tutorial** software package for training end users on Appgen applications.

The **Operator Training Tutorial** is said to take novice end users through such procedures as system logon and logoff, menu selection, data entry procedures and editing shortcuts.

The **Operator Training Tutorial** program is available on machines that are running AT&T's Unix and Microsoft

Corp.'s Xenix.

The program costs \$95 for both the software and manual.

The manual is available separately at a cost of \$50.

**Software Express**, 7th Floor, 2925 Briarpark Drive, Houston, Texas 77042.

### Services

**IBM** has announced **additional maintenance service** for third-party add-ons for its Personal Computer.

Ten of the products added to the list are configurations of **AST Research, Inc.'s Advantage** multifunction boards.

The other products include the **Hewlett-Packard Co. Thinkjet** printer, the **Emulex Corp. DCP 88VM** board and the **Forte Data Systems Co. Graph Card** and **Forte PJ**.

Other added products include the **Hercules Computer Technology, Inc. Color Card** and **Hercules Graph Card** and

**Digital Communications Associates, Inc. Irma 1.42** board.

A customer with an **IBM PC** including third-party cards serviced by **IBM** can add the cards to the maintenance agreement or withdraw the entire machine from the agreement.

Annual carry-in minimum maintenance fees range from \$35 to \$270.

On-site repair costs \$10 more.

**IBM**, Old Orchard Road,

Armonk, N.Y. 10504.

**Dow Jones Information Services** has announced **Quicksearch**, a service to aid an on-line search for company information.

A complete **Quicksearch** report is said to include a current quote, the latest news current to 90 seconds and a financial and market overview.

The report also includes earnings estimates, company vs. industry performance, quarterly income statements and balance sheets and company profiles.

Users can search for information using the company name or stock symbol.

**Quicksearch** costs \$39 for a complete company report.

**Dow Jones**, P.O. Box 300, Princeton, N.J. 08540.

**Tectran Corp.** has introduced a national **For Sale By Owner** electronic listing service for used computer equipment.

The service allows sellers to establish a listing of their equipment.

Buyers are provided with the names and telephone numbers of sellers free of charge.

Listings access is available on the vendor's 1,200 bit/sec. **Digital Equipment Corp. VT100** emulation data line.

A one-time listing fee is paid to activate the listing. The size of the fee depends upon the asking price of the equipment, starting at \$29.95 for equipment worth less than \$2,000.

**Tectran**, 780 Wellington Ave., Cranston, R.I. 02910.

## MICROS

### Systems

**Mighty Computers Co.** has introduced **MC-32 Personal Supermini**, a 32-bit personal computer workstation.

**MC-32** runs under the host personal computer's **Microsoft Corp. MS-DOS** operating system. It is said to feature a coprocessor board powered by the **National Semiconductor Corp. 32032** 32-bit CPU with up to 8M bytes of on-board memory.

The **MC-32** can also run **AT&T's Unix System V, Version 5.2** to become a multitasking, multiuser system with file and record locking capabilities, according to the vendor.

The **MC-32 Personal Supermini** system with 1.5M bytes of random-access memory, a 10-MHz coprocessor and a 20M-byte hard disk costs \$3,500.

**Mighty Computers**, Suite 207, 4529 Angeles Crest Highway, La Canada, Calif. 91011.

you can even carry it under your arm.  
take lightly. Anywhere.



# DICONIX

A Kodak Company

3100 Research Boulevard  
Dayton, Ohio 45420  
1-800-DICONIX



## NEW PRODUCTS/MICROCOMPUTERS

**Accrex Information Systems** has announced a turn-key optical disk-based document storage and retrieval system.

The system is composed of the vendor's indexing and search software with a write-once, 5¼-in. optical disk.

It includes an IBM Personal Computer AT, a document digitizer-scanner and an optical disk drive.

According to the vendor, the system also includes cus-

tomized application software and a full-page bit-mapped display. It also includes a laser printer.

The modular system is said to be able to be expanded to multiple image workstations by adding a local-area network and utilizing multiple optical disks as image servers.

The document storage and retrieval system is priced at \$49,900.

Accrex, Suite 600, 131 Steuart St., San Francisco,

Calif. 94105.

**Philips Information Systems, Inc.** has announced the **Philips P3102** and **P3200** personal computers.

Both systems were designed to act as intelligent workstations and also to act as stand-alone tools, according to the vendor.

The P3102 features color graphics emulation and IBM Personal Computer compati-

bility, the vendor said.

The machine reportedly offers 512K bytes of memory, expandable to 640K bytes.

It runs under Microsoft Corp.'s MS-DOS 3.1.

The P3200 is an IBM PC AT compatible.

It is available with one 1.2M-byte floppy drive or one 1.2M-byte drive and a 25M-byte hard disk drive.

The computer has eight expansion slots and a 12-in. monochrome monitor. In ad-

dition, it runs under MS-DOS 3.1.

The P3102 is priced from \$1,752, and the P3200 is priced from \$3,795.

Philips Information Systems, Suite 300, LB 35, 15301 Dallas Pkwy., Dallas, Texas, 75248.

### Software applications packages

**Baker & Rabinowitz, Inc.** has introduced the **Personal Applications Executive** (PAX) operating system for IBM Personal Computers.

PAX is said to give software developers multitasking advantages.

The operating system includes features such as high-speed device drivers and a completely functional demonstration system, the vendor said.

The drivers include optimized assembly-language procedures for video display, printer output and interrupt management.

The complete PAX system costs \$149.95.

Baker & Rabinowitz, 3869 Kilbourne Ave., Cincinnati, Ohio 45209.

## The Preventive Medicine that Reduces System Outages by 90%.

# STABILIZE/CICS

### Detects and Repairs Most CICS System Abends Instantly



#### The Best Medicine Cures the Problem Before It Occurs

**STABILIZE/CICS** is the "preventive medicine" MIS/DP installations have been waiting for. **STABILIZE** diagnoses critical CICS systems problems and then automatically supplies real-time corrections. Now you can get a powerful mainframe software product that will reduce your systems outages by 90 percent!

**Keep Your System Up and Running** **STABILIZE** combines two powerful systems working in unison. The System Repair Component automatically repairs corrupt system components, while the Diagnostic Component provides on-line diagnostic information.

When problems occur, the Repair com-

ponent immediately goes into action. Functionality is restored within seconds, preventing typical 30-minute outages. At the same time, the diagnostic component displays the cause of the problem, helping your staff to prevent future occurrences of the same error.

The results—**STABILIZE** delivers enormous productivity improvements for the people who use your CICS systems.

#### Key Benefits of STABILIZE:

- Continuous operation for critical business functions
- Safe, simultaneous protection for multiple CICS regions
- No impact on systems response
- Reduced risk of repeated problems
- Increased CICS programmer productivity
- Quick and easy installation
- Automatic diagnosis of error conditions

#### FREE 30-DAY TRIAL OFFER!

Get the prescription your CICS installation needs to increase system availability. Call us now toll-free for a **FREE 30-DAY TRIAL**, or for more information on our products, our courses, and our free product seminars.



**On-Line Software International, Inc.**

Two Executive Drive, Fort Lee, NJ 07024

**1-800-526-0272**

Or in New Jersey call 201-592-0009.

IBM is a registered trademark of International Business Machines.

**American Teledata Corp.** has announced **Amtel Credit Reporting**, a software package that is said to automate inquiries made to credit bureaus.

**Amtel Credit Reporting** is able to minimize credit bureau access charges.

The system reportedly selects the best bureau for a specific geographic area and then calls up the bureau using a preconfigured ZIP code table.

The credit information is saved on disk and may be printed or reprinted at any time. This procedure provides complete archive capabilities.

**Amtel Credit Reporting** simultaneously processes up to 200 applicants, according to the vendor.

**Amtel Credit Reporting** works on IBM Personal Computers and compatible machines.

The software package is priced at \$295.

American Teledata, Building 320, 8100 S. Akron, Englewood, Colo. 80112.

**Intex Software Systems International, Ltd.** has introduced a multilingual word processing program called **Intext** for IBM Personal Computers.

According to the vendor, **Intext** can change from one language to another in mid-text. It automatically reconfigures the computer keyboard to the national standard of any of 41 foreign languages, including non-Roman alphabets and those written from right to left.

## IBM® Software Authorities



## NEW PRODUCTS/MICROCOMPUTERS

Output can reportedly be printed on dot matrix, laser or letter-quality printers.

Graphics capability is needed for languages with non-Roman alphabets.

Intext is priced at \$495 for two languages.

Intext Software, 488 Madison Ave., New York, N.Y. 10022.

The Crosby Co. has announced a statistical process control software package called **X & R Master**.

The package is said to perform X-bar and R-type statistical process control calculations.

It produces control charts and process capability reports.

It prints average, range, tolerance, standard error, moving mean and distribution charts.

The process capability studies are controlled by a menu and calculations and tests for control are automatic.

X & R Master is priced at \$59.95.

Crosby, P.O. Box 2433, Glen Ellyn, Ill. 60137.

Syntactics Corp. has announced the availability of its **Crystalwriter Plus** object-based word processing software for the IBM Personal Computer AT and compatibles running under Microsoft Corp.'s Xenix-based systems.

According to the vendor, Crystalwriter Plus features object-based design for text handling, a spelling checker and corrector, automatic footnoting, text merge and an integrated forms editor and records manager.

Crystalwriter Plus is also used on systems running under Bell Laboratories' Unix System V, System III and the University of California at Berkeley System 4.2.

Crystalwriter Plus costs \$695.

Syntactics, Suite 145, 3333 Bowers Ave., Santa Clara, Calif. 95054.

Gordon Group has announced its **Before You Leap** knowledge-based software project estimation and scheduling package.

Before You Leap is said to provide schedule estimates for financial, military-standard, scientific or any other type of software written on microcomputers, minicomputers and mainframes.

Before You Leap can also reportedly forecast detailed manloading requirements by task across the major time phases of the software project.

In addition, the program can be used as a macro estimation tool, making a single estimate for each software

project, according to a company spokesman.

Before You Leap is priced at \$495.

Gordon Group, Suite 321, 2530 Berryessa Road, San Jose, Calif. 95132.

## Software languages

Online/Database Software, Inc. has introduced a Cullinet Software, Inc. **IDMS compatible/Cobol workstation** for use with The Application Builder (TAB).

With the inclusion of the IDMS compatible/Cobol workstation, TAB users can create, edit, develop and run an IDMS/R Batch Cobol program.

TAB operates on an IBM Personal Computer XT, Personal Computer AT or compatible with 640K bytes of memory and a minimum of 6M bytes on hard disk.

TAB and its various components are priced at \$6,100. Current users can upgrade for \$1,000.

Online/Database Software, One Blue Hill Plaza, Pearl River, N.Y. 10965.

## Software utilities

American Programmers Guild, Ltd. has announced **Xpack**, a file transfer and security software package.

Xpack is said to allow users to encrypt any file to be sent through standard seven-bit electronic mail such as MCI Communications Corp.'s MCI Mail or ITT's Dialcom.

Features include the ability to use menus or to run directly from Microsoft Corp.'s MS-DOS, to encrypt all documents and to run communications software directly from the Xpack menu in order to send files immediately after they are encrypted.

Xpack runs on IBM Personal Computers or compatibles and costs \$49.95 per copy.

American Programmers Guild, 12 Mill Plain Road, Danbury, Conn. 06811.

## Everybody's Copying Our Micro-to-Mainframe Link FREE-LINK™ With Unlimited Site Licensing



### As Many Copies as You Need

For the first time, you can make as many copies of our FREE-LINK micro software as your organization needs. It's no longer necessary to pay for each individual copy or to ask your vendor to authorize additional copies. We've already taken care of that for you. A renewable yearly license for our mainframe software lets you link as many users to the mainframe as you want, at no additional cost. We've even included free maintenance as well as continuous software updates.

### The Leader in Link Software from the Beginning

FREE-LINK is the most talked about micro-to-mainframe link in the industry. Since its introduction, over 600 users have found FREE-LINK easy to use and adaptable to their specific

needs. FREE-LINK has created a new generation of link users—people who were looking for an inexpensive, no risk way of addressing their organizations' micro-to-mainframe link needs.

### Powerful, Practical Software

FREE-LINK is powerful, practical software. Now users can take full advantage of their PCs by accessing mainframe data quickly and in a format that's ready to use. With a single keystroke, FREE-LINK users can download and

reformat mainframe VSAM files for insertion into popular PC software like Lotus® 1-2-3™ and dBASE II®/III.™ FREE-LINK's menus and help facilities make this link incredibly easy to use. Best of all, FREE-LINK installs in just hours.

### On-Line Software—A Name that Means Expertise

On-Line Software wants to share its expertise as a software developer, educator, and consultant with you. Ask about our free seminars in major cities nationwide. We've even written a booklet, *Micro-to-Mainframe Links—Separating State of the Art from State of Confusion*. For your free copy, call Ms. Bernie Burke toll-free at (800) 526-0272.

Everybody's copying our micro-to-mainframe link, and you should too!

Call us now for more information on our products, courses, seminars, and our free booklet.



**On-Line  
Software  
International,  
Inc.**

Two Executive Drive, Fort Lee, NJ 07024

**1-800-526-0272**

Or in New Jersey call 201-592-0009.

IBM is a registered trademark of International Business Machines. dBASE II, III are trademarks of Ashton-Tate. Lotus 1-2-3 is a registered trademark of Lotus Development Corp.

## IBM® Software Authorities



## NEW PRODUCTS/MICROCOMPUTERS

**Microsolutions, Inc.** has introduced **Unidos**, a software program said to allow IBM Personal Computer and compatible users to run 8-bit Digital Research, Inc. CP/M programs directly on the PC without additional hardware.

Unidos is said to emulate a Zilog, Inc. Z80 microprocessor and create a complete CP/M Version 2.2-compatible environment for running 8-bit CP/M software. Unidos executes Z80 instructions and does not require any changes to CP/M programs. Unidos features a built-in support if the PC has a NEC Corp. V-Series microprocessor installed.

Unidos is priced at \$69.95, according to the vendor.

Microsolutions, 125 S. Fourth St., DeKalb, Ill. 60115.

**Softcorp** has introduced **Toolkit II**, a histogram printing program for its Advanced Pro-Path 6 project management package.

Toolkit is a utility program said to produce cost and resource allocation histograms from Advanced Pro-Path 6 project files. According to the vendor, it works without modification to existing project files.

Toolkit II can send histograms to a variety of devices, such as the computer screen or disk file. Printers do not require graphics capabilities.

Toolkit runs on IBM Personal Computers. It costs \$49. Advanced Pro-Path 6 costs \$199.

Softcorp, Suite 244, 2340 State Road 580, Clearwater, Fla. 33575.

**Microport Systems, Inc.** has introduced **System V/AT**, a version of AT&T's Unix System V Release 2 IAPX286 Version 1 designed for the IBM Personal Computer AT.

System V/AT is said to feature a virtual screen windowing system, dynamic disk buffer allocation for random-access memory disk performance, file system hardening and a symbolic debugger.

The runtime system costs \$159. The software development system and the text processing system cost \$169 each. Together, they cost \$439.

Microport Systems, 10096 Soquel Drive, Aptos, Calif. 95003.

**Structured Software Systems, Inc.** has announced **SDF200**, a language enhancement said to add a hierarchic disk directory format to the Basic and Pascal operating systems for Hewlett-Packard Co. Series 200 and 300 desktop computers.

SDF200 provides single-

workstation users with the structured directory format for the operating systems without requiring a shared resource manager controller.

Features include multiple-tree-structured directories, logical file groupings, 16-char. file names, extendable files and directories and selective backup and compatibility with shared resource manager and Series 500 disks.

SDF200 costs \$600, the vendor said.

Structured Software Systems, 1072 Irick Road, Mount Holly, N.J. 08060.

**Microsolutions, Inc.** has announced **Matchpoint-PC**, said to allow IBM Personal Computer users to read from and write to Apple Computer, Inc.'s DOS, Prodos, SOS and Apple CP/M disks.

The Matchpoint-PC package consists of the Matchpoint-PC card and software

disk and a copy of Uniform-PC Version 2, designed to work with the Matchpoint-PC card.

Uniform-PC is said to make the computer see CP/M disks as IBM PC-DOS disks. Matchpoint-PC also allows the use of Apple Softcard and Northstar CP/M disks as though they were DOS disks.

Matchpoint-PC is priced at \$195.

Microsolutions, 125 S. Fourth St., DeKalb, Ill. 60115.

**Solutions, Inc.** has introduced **Glue** for Apple Computer, Inc.'s Macintosh.

Glue is said to add a print-to-disk capability to most Macintosh applications, enabling desktop publications to include graphics from almost any Macintosh applications in a newsletter. Glue is also said to facilitate the electronic distribution of newsletters, because once a newsletter has been printed to disk it can be routed through a network or an elec-

# Imagin th



## NEW PRODUCTS/MICROCOMPUTERS

tronic mail system.

According to the vendor, the images copied by Glue are not limited by the size of the Macintosh screen.

Glue is priced at \$49.

Solutions, P.O. Box 989, Montpelier, Vt. 05602.

### Software data base management systems

Dynamic Graphics, Inc. has introduced **Desktop Art** for use with Apple Computer, Inc.'s Macintosh.

The software is composed of volumes of digitized graphics selected from the company's library of illustrations and photos. Each volume contains at least 300 illustrations stored on two diskettes as Macpaint documents.

The first two volumes are **Graphics & Symbols 1**, a collection of pictograms and symbols, and **Artfolio 1**, a compilation of people, objects and animals.

Graphics & Symbols 1

costs \$66.95, and **Artfolio 1** costs \$74.95.

Dynamic Graphics, P.O. Box 1901, 6000 N. Forest Park Drive, Peoria, Ill. 61656.

■  
**Intermec Corp.** has announced **PCLM**, its multipurpose personal computer label manager.

PCLM is said to give users the ability to create and store an infinite number of label

formats on floppy or hard disks. It offers a label audit feature that tells how many labels have been produced. It also includes a library of preformatted labels.

PCLM is said to be written around the Revelation data base management program and allows users access to other DOS files downloaded from the mainframe.

PCLM is priced at \$695.

Intermec, P.O. Box 360602, 4405 Russell Road, Lynwood, Wash. 98046.

### Software enhancements

**Software Directions, Inc.** has announced **Printq Version 3.0**, its print spooling software for the IBM Personal Computer.

Version 3.0 is said to provide the ability to begin printing a report while that report is still being spooled. Changes have also been made in the Printq Status Display.

According to the vendor, Printq was designed after the print spooler used in the IBM System/38.

Software Directions, 1572 Sussex Tnpk., Randolph, N.J. 07869.

### COMMUNICATIONS

#### Controllers

**Netronix** has announced the **MNA100** Multibus network adapter designed to provide Intel Corp. Multibus-based systems with access to the IBM PC Network.

The adapter is said to be completely IBM PC Network-compatible at both the hardware and protocol levels. It features an Intel 80188 CPU that provides protocol processing through the session level. The host system communicates with the adapter via dual-ported memory.

The adapter operates on a CATV-type broadband system. It costs \$1,595.

Netronix, 1372 N. McDowell Blvd., Petaluma, Calif. 94952.

#### Voice/data communications

**Votan** has introduced its **Votan Telecenter** IBM Personal Computer-based voice mail system with voice recognition capabilities.

Votan Telecenter records, plays back and distributes individualized messages. The system's voice recognition capability is said to enable users to utilize functions by using voice commands.

The Votan Telecenter ranges in price from \$10,950 to \$19,450.

Votan, 4487 Technology Drive, Fremont, Calif. 94538.

#### Software

**LaSalle Micro, Inc.** has released **Version 1.2 of Backcomm**, its communications software program that operates in the background of IBM Personal Computers and compatibles.

Backcomm 2.1 includes such features as the ability to encrypt and decrypt files and to squeeze and unsqueeze files without leaving the program. It also offers password protection and automatic call scheduling by day, date and time.

Backcomm also features a built-in command language, **Backtalk**, which allows for communication as well as

Continued on page 100

## The largest independent supplier of System 3X compatible peripherals wants to be your data processing partner.

Imagine for a moment what it would be like to have a partner behind you with the full range of products and support you need for your System 3X.

That partner is your Decision Data Computer Corporation representative.

### Behind you with a network of products

A network of 3X products, some of which include workstations, workstations with printer port and personal printer, intelligent terminals, communications controllers, non-impact, band, matrix line, matrix serial, and letter quality printers, tape back-up systems, memory modules and software.

### Behind you with a network of support

That network includes other Decision Industries' subsidiaries starting with a nationwide systems service organization that's 120 locations strong. Decision Data Service, Inc. boasts 600 highly trained field engineers, and promises virtually unsurpassed on-site service and response time.

What's more, through our Research and Development Group, that network of support expands with our ongoing commitment to design and develop new, high quality products. Products you've told us you need for increased productivity.

Completing the network are other subsidiaries providing you with support that includes telemarketing, specialized software applications packages, and an international sales and service organization.

### But that's not all of it

The Decision Data difference is our partnership commitment. That commitment means, whether you're a single or multiple System 3X user, you're important to us. And we'll be there with superior products, service and continuing support to back you up everytime.

Contact your Decision Data Computer Corporation representative for more information on how our partnership commitment can work for you.

Decision Data Computer Corporation. We're a network of products. We've got a network behind them. And we want to be your data processing partner.

Imagine that!



400 Horsham Road  
Horsham, PA 19044-0996

CALL TOLL FREE: (800) 523-6529  
IN PENNSYLVANIA CALL: (215) 757-3322

# e at!



## NEW PRODUCTS/COMMUNICATIONS

Continued from page 99

disk file read and write; and interfacing to other programs executing simultaneously on the computer.

Backcomm costs \$95.

LaSalle Micro, 1350 Remington Road, Schaumburg, Ill. 60195.

### Multiplexers/Modems

**Astrocom Corp.** has enhanced its **E299 Squeezplexer**.

The E299 Squeezplexer is now rack-mountable so that up to four units can be contained in one rack. According to the vendor, the E299 supports up to 32 IBM Category A or compatible terminals or printers at distances of up to 10,000 ft through the use of four RG62A/U coaxial cables. The E299 demultiplexes data from any IBM 3274 Model 41 or 3274 Model 61 series controller equipped

with the optional 9901 extended time-out interface.

The E299 is available in 8-, 16-, 24- and 32-port configurations. The 32-port configuration costs \$2,930.

Astrocom, 120 W. Plato Blvd., St. Paul, Minn. 55419.

**Scitec Corp. USA** has announced the **Scitec Saturn D4** advanced T-carrier modem.

The modem is said to operate between NRZ data equipment and the North American terrestrial DS1 service.

It features standard primary rate speeds of 1.536M bit/sec. and 1.344M bit/sec., as well as subrate speeds that are multiples of 56K bit/sec. and 64K bit/sec. Scitec D4 provides both D4 and extended superframe framing

on the network side.

Scitec Saturn D4 costs \$3,500.

Scitec, 850 Aquidneck Ave., Middletown, R.I. 02840.

**Creative Digital, Inc.** has introduced the **Mercury Fastmodem 1200B** internal modem for IBM Personal Computers and compatibles.

The modem is said to feature autoanswer, tone- and pulse-dial capabilities and connection to most time-sharing systems as well as to other personal computers.

The modem operates asynchronously at 1,200 bit/sec. with a fallback to 300 bit/sec.

In autoanswer mode, the modem automatically detects and responds to the transmission speed of the calling modem.

**Mercury Fastmodem 1200B** costs \$299.

Creative Digital, Suite D207, 1620 Old Oakland Road, San Jose, Calif. 95131.

### Test equipment

**Electrodata, Inc.** has enhanced its **CTS 3** communications test set.

The data and capture buffers of the CTS 3 have each been doubled to 4,000 characters, and built-in routines have been added to perform bi-synchronous and Synchronous Data Link Control spooling tests, VDT and printer tests and terminal simulation routines and echo tests.

Eighteen preprogrammed setup menus for monitoring and trapping applications have also been added, according to the vendor.

The CTS 3 costs \$1,995.

Electrodata, 23020 Miles Road, Bradford Heights, Ohio 44128.

**TITN, Inc.** has introduced its **Experdata E20 Ethernet Tester**.

The E20 allows users to test Ethernet local-area network components to see if they conform to Ethernet Version 1.0, 2.0 or 802.3 standards.

According to the vendor, the test also measures traffic on the network and simulates different types of traffic for capacity planning and troubleshooting.

Experdata E20 can be used to check transceiver functions such as the transmit and heartbeat before installation on a network as well as to perform echo and collision tests and line-quality test work.

The Experdata E20 Ethernet Tester costs \$4,500.

TITN, 5591 W. 78th St., Edina, Minn. 55435.

### SYSTEMS & PERIPHERALS

#### Data storage

**Southern Data Systems, Inc.** has introduced the **SDS 2290V** family of disk drives for Wang Laboratories, Inc. VS computer systems.

The SDS 2290V disk drives range in capacity from 76M bytes to 576M bytes. Each drive is either a 76M-byte removable drive or a 288M-byte fixed drive.

The 288M-byte fixed drive supports a 30,000-hour mean time between errors. Both drives utilize standard cables and are plug-compatible with Wang 2265V-2 and Control Data Corp. 9766 disk drives.

The SDS 2290V disk drives cost from \$8,395 for the 76M-byte model to \$19,290 for the 576M-byte model.

Southern Data Systems, P.O. Box 31192, Raleigh, N.C. 27622.

**Emulex Corp.** has introduced the **UC14** Unibus host adapter designed to connect a Digital Equipment Corp. PDP-11 or VAX-11 series computer to the small computer systems interface (SCSI) while implementing DEC's Mass Storage Control protocol.

The host adapter combines with Emulex S2/SCSI, enhanced small disk interface and ST506 disk and tape controllers. The user can choose from a variety of 5¼-in. Winchester disk drives and ¼-in. cartridge tape

Continued on page 102

With MULTSESS system support software, handling multiple VTAM applications isn't an amazingly difficult feat. MULTSESS is easy to install, easy to maintain and easy to use, giving you the capability to access multiple VTAM applications—or even two or more connections to one application—from any number of 3270 type terminals in your system.

MULTSESS delivers increased reliability of on-line systems, eliminates the

need for costly hardware upgrades, helps control overhead by improving system efficiencies and gives you increased flexibility through MULTSESS optional pooling capability. Total system security is assured through interface capability with all major security programs.

See for yourself what many Fortune 500 companies have already discovered about multiple session management with optimum security. It is easier than it looks. Call 800/348-3523 (in Pennsylvania call

412-256-2900) for more information on MULTSESS from Westinghouse Management Systems Software.



**Westinghouse**

Westinghouse Electric Corporation  
Management Systems Software  
P.O. Box 2728, Pittsburgh, PA 15230-2728

## Multiple session management.

It's easier than it looks.

Call 800-348-3523  
(in Pennsylvania, 412-256-2900)  
for more information  
about MULTSESS



## Morino Associates, Inc. TSO/MON

FROM THE DESK OF MARIO M. MORINO

Advertising

Re: New Datapro TSO/MON report  
(attached)

Order several thousand reprints and offer them in an ad. Make sure to point out that our installed user base is now over 700 and that we've indexed the documentation.

You might want to highlight some of the quotes -- especially the one about TSO/MON having no competition. And the one about our fine reputation! (I've circled them.)

Give me a call if you have any questions.

Mar

All measurements and recordings are standardized and can be selected by the user when the system is implemented. The reports produced by the system are derived from a standard list of reports, but users can incorporate optional reports through a user exit routine. The monitor operates as an integral part of the operating system environment and interfaces with the SRM and SMF facilities of the operating system as they, in turn, interface with the TSO communications facility. For users with the IBM SP/ or ISPF program products, an SP/ISPF interface option is available; it monitors TSO/SP/ISPF activities and reports on SP/ISPF split-screen operations, as well as on command and user activities. A TSO/MON ONLINE option provides realtime control for MVS/TSO users.

### Competitive Position

TSO/MON has no direct competition because it is the only performance measurement system dedicated solely to TSO performance measurement. There are several other products that provide TSO performance measurement, but they are not dedicated to TSO performance measurement.

MARIO -  
GREAT IDEA!  
THINK WE SHOULD INCLUDE  
A COUPON TO SPEED THE RESPONSE  
PROCESS. WE'LL TRY TO WORK IN OUR  
LEADERSHIP IN IS MANAGEMENT & OUR  
"ASK OUR USERS" MOTTO. DON'T KNOW  
IF THERE'LL BE ROOM. BETTY

PS. HOW ABOUT A MAILING OF THE  
REPRINTS TO HOT PROSPECTS FOR  
OUR NO-RISK EVALUATION? (SEE SENTENCE  
UNDERLINED IN RED.)

for problem determination. However, those are general systems not designed for TSO only; they simply provide TSO information on demand as part of the overall system.

gone without saying that IBM is targeting its operating system efforts for the large mainframe user base toward MVS and its extensions. It is, however, widely acknowledged that the MVS environment is the hardest to control as far as performance is concerned. There are myriad factors that must be taken into consideration when trying to optimize the performance of an MVS system, not the least of which is the TSO monitor's effect on the system. Rather than having lost its appeal because of its age, TSO has been rejuvenated and is realizing more popularity than ever before. TSO/MON is one of the few monitoring products that address the entire TSO environment, including interfacing applications, interacting systems software, and networking implications brought about by the implementation of remote TSO networks in most large MVS shops.

Morino Associates is, and has been for many years, one of the leaders in large IBM operating system performance measurement products. Many of its earlier development efforts were, and still are, being marketed by other companies in the performance software industry, but with the introduction of TSO/MON, Morino struck out on its own. Concentrating solely on the MVS marketplace, the vendor has acquired a high degree of respect from that user community.

Morino's products usually are comprehensive, and the vendor has a fine reputation for responding to user requests for product improvements. In the latest release of TSO/MON, for example, Morino Associates not only significantly improved the online capabilities of TSO/MON, but also improved system performance and resolved some of the limitations for which the product had been criticized in the past.

As previously stated, there is a noticeable growth in the popularity of TSO in the MVS environment, and this marriage carries with it many problems that adversely affect MVS performance. It is important, especially in the online environment, for large data centers to get to the heart of those problems quickly and resolve any apparent bottlenecks. To that end TSO/MON and the TSO/MON options are dedicated. Every MVS/TSO user owes it to himself or herself to evaluate the degree to which his or her shop can use this monitor to improve operational performance.

### Advantages & Restrictions

TSO/MON effectively pinpoints causes of poor response time, identifies violators of any system standards, and even helps to structure standards if none exist at an installation. It provides management with a complement of standard reports to support work load planning, scheduling, and

CORPORATION, DELRAN, NJ 08076 USA



## MORINO ASSOCIATES

- ☐ Yes. I want to read an independent, in-depth report on TSO/MON, the TSO management system.
- ☐ Yes. I want to know more about your 30-day no-risk evaluation offer. Please phone.

Name \_\_\_\_\_ Title \_\_\_\_\_

Organization \_\_\_\_\_ Mail Code \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State/Province \_\_\_\_\_ Zip/Postal Code \_\_\_\_\_

Country \_\_\_\_\_ Phone \_\_\_\_\_

Mail to: Morino Associates, Inc.  
8615 Westwood Center Drive, Vienna, VA 22180-2215

CW



## NEW PRODUCTS/SYSTEMS &amp; PERIPHERALS

Continued from page 100

drives. Features include direct memory access, optical disk drive support, an SCSI-protocol controller and 18-bit addressing.

The UC14 is priced at \$2,200.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

## Terminals

**Codonics, Inc.** has introduced the **I-300** graphics enhancement package designed to provide Wyse Technology, Inc. 50 and 75 terminals with Tektronix, Inc. 4010 and 4014 emulation.

Features provided include 1,024-by-800-pixel graphics display and a 1,024-by-1,024-pixel physical memory area.

The vector drawing rate is said to be more than 1,000,000 pixel/sec.,

and the data transfer rate is 38.4K bit/sec.

The complete I-300 graphics enhancement package costs \$1,095.

Codonics, 18001 Englewood Drive, Middleburg Heights, Ohio 44130.

**HOB Electronic** has announced the **Series 80** family of IBM 3270-compatible terminals.

The terminals connect to IBM's 3274 and 3276 cluster controllers and use a two-component architecture combining a 16-bit terminal microprocessor with the firm's mainframe terminal control program, Codis.

Models include the HOB 88R 3178-compatible with 15-in. screen; the HOB 88S 3178-compatible with 15-in. screen, user-specific functions, programmability and an RS-232C port;

the HOB 89S; the HOB 88S with a 14-in., seven-color screen; the HOB 88E 3270-compatible featuring multiple sessions, electronic notebook and data compression and selection; and the HOB 89E, with the same features as the 14-in. color screen HOB 88E.

Prices are \$1,590, \$1,990, \$2,390, \$2,390 and \$2,790, respectively.

HOB Electronic, Bldg. D, 7 Kimball Lane, Lynnfield, Mass. 01940.

## Printers/Plotters

**Laserlink Systems, Inc.** has announced its **Laserlink Expansion Card** for the Canon, Inc. LBP-8 A1 desktop laser printer.

According to the vendor, the Laserlink Expansion Card gives the Canon A1 laser printer full bit-map raster graphics, vector graphics and forms and multiple font capabilities.

The card is also said to provide the Canon A1 laser printer with 1.125M bytes of random-access memory. With the expansion card, the Canon A1 can be upgraded to match the full-page, 300 dot/in. graphics capacity of the Canon LBP-8 A2.

The Laserlink Expansion card costs \$995.

Laserlink Systems, 161 Knollwood Drive, San Rafael, Calif. 94901.

**CIE Terminals** has announced that its **Lips 10 Laser Printer** is compatible with Hewlett-Packard Co.'s Laserjet printer.

Lips 10 is said to provide a 10 page/min. print speed compared with Laserjet's 8 page/min. The printer also has an additional 11 Laserjet-compatible font cartridges. One feature is the printer's two simultaneous on-line font cartridges that are operator-controlled either at the printer's panel or by the software.

The Lips 10 printer costs \$3,495. An upgrade compatibility kit costs \$200. The fonts are priced from \$195 to \$345 each.

CIE Terminals, 2505 McCabe Way, Irvine, Calif. 92714.

**Seikosha Co.** has introduced the **MP-1300** convertible monochrome-to-color printer.

The MP-1300 is said to be capable of producing draft-quality printing at 300 char./sec. and letter quality at 75 char./sec.

It features 185 IBM and ASCII software-generated character sets and eight international fonts, as well as graphics. Other features include rear and bottom paper loading and parallel and serial interfaces.

There is an optional snap-in, seven-color printing kit to add full-color alphanumeric and graphics printing.

The MP-1300 costs \$799, and the optional color printing kit costs \$155.

Seikosha, Suite SW3/249, 10080 N. Wolfe Road, Cupertino, Calif. 95014.

## PRICE REDUCTIONS

**Micro-Term, Inc.** has announced price reductions for its **400 series** of terminal products.

Specific reductions are as follows: Model 420 from \$695 to \$595; Model 425 from \$895 to \$695; Model 440 from \$1,695 to \$1,495; and Model 450 from \$595 to \$545.

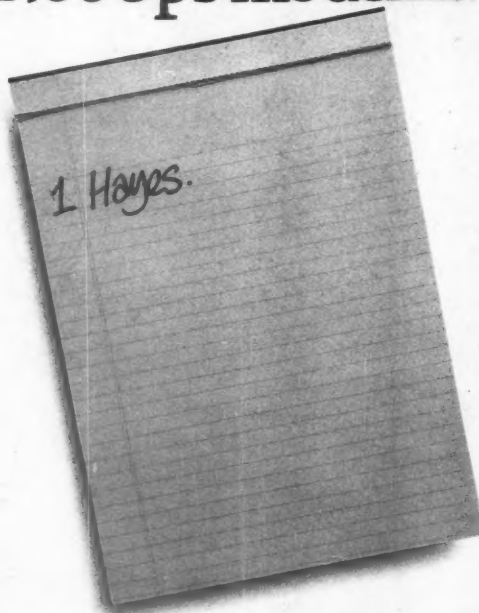
Micro-Term, 512 Rudder Road, Fenton, Mo. 63026.

**Algor Interactive Systems, Inc.** has reduced the price of **Supersap**, a finite element for stress, dynamic and heat transfer analysis for the IBM Personal Computer AT and compatibles.

Said to offer unlimited problem size, Supersap comes on 20 360K-byte diskettes. It contains two- and three-dimensional mesh generators, an interactive model editing system, preprocessing and 3-D graphics display on the front end. On the back end, it has postprocessing for stresses, displacements and heat flux.

Supersap now costs \$1,500. Algor Interactive Systems, Essex House LI, Essex Sq., Pittsburgh, Pa. 15206.

## A complete list of things to know about 2400 bps modems.



Now that you've memorized that, here's a partial list of why a Hayes® Smartmodem 2400™ is best for you.

1. The Hayes Smartmodem 2400 allows you to communicate with the vast installed-base of 300, 1200 and 2400 bps "Hayes-compatible" modems. The Hayes Standard "AT" Command Set allows you to use Smartcom II® and other software that communicates.

2. Through synchronous/asynchronous technologies, the Smartmodem 2400 permits your PC to access mainframes, minis, and on-line services previously inaccessible through asynchronous-only modems.

3. The Hayes Smartmodem 2400 is efficient...it pays for

itself in just 4 hours of annual use over long distance.

4. The technology of the Smartmodem 2400 allows you to transfer volumes of files with confidence across the city or

across the ocean using Bell and CCITT standards.

5. The new Smartmodem 2400B™—a plug-in board for the IBM PC and compatibles—allows synchronous and asynchronous communication through the same Com port.

6. You will also get the Hayes standard 2-year limited warranty and the opportunity to extend the warranty to 4 years.

Best of all...you get Hayes. And that's all you ever really have to know!

For more information or technical specs, contact your authorized Hayes dealer. Or Hayes directly at (404) 441-1617.

Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, Georgia 30348.



# Hayes

Say yes to the future with Hayes.



# COMPUTER INDUSTRY

Section begins on page 134

## SRC stumbles over start-up hurdles in connectivity mart

### Late product arrivals, layoffs trouble firm

By Stanley Gibson

NATICK, Mass. — Despite targeting one of the most important areas in the computer industry today — multivendor connectivity — Software Research Corp. (SRC) finds itself in a perilous situation due to many woes characteristic of start-up companies.

In the last six months, SRC has seen almost half of its 125-member work force depart, either voluntarily or through layoffs. Company officials point to delays in getting SRC's ambitious products to market as the reason for the layoffs.

SRC's major product is Strategic Network Exchange (SNE), which is intended to connect a number of different computers from vendors such as Wang Laboratories, Inc., Digital Equipment Corp. and IBM. But SRC's problems came about because of the difficulty of marrying a software engineer's dream with the right kind of management expertise.

"They tried to do too much too fast. They were trying to do something that was unparalleled," says George Colony, president of Forrester Research, Inc. of Cambridge, Mass. "They had problems from the

beginning because they couldn't explain the product to anyone. I don't think the management or venture capitalists ever understood what the product was."

Founded as a consulting firm in 1978, SRC began product development in 1984 with the first round of what would reportedly total \$11 million in venture capital over the following two years. Investors include the venture capital firms Eastech Management Co. and Welsh, Carson, Anderson & Stowe, neither of which would comment on the present status of SRC.

The company required additional funds of an unspecified amount in May of this year, according to several sources.

"The layoffs were a result of not being able to have the product on time — to get the revenues up to the level we needed," says Eduardo Stecher, SRC's marketing vice-president. Stecher cofounded SRC with Alan Vecchio to provide network consulting services to vendors developing IBM-compatible equipment.

"It was a lot more complex than we ever thought," Stecher says of the company's efforts to develop multivendor connectivity software.

Bernie Wess, an independent consultant based in Needham, Mass.,

voices a similar view. "How can a small company solve the problems that IBM has to solve?" he asks. "It's an extraordinary undertaking."

Stecher says SNE has been shipped to 16 companies, some of which are using it on a trial basis.

One user from a large financial services company says his company decided to use SRC's software, rather than DEC or Wang IBM connectivity software, because it wanted a single-user interface for data transfer and electronic mail.

"We're very pleased with how it has gone. Our concern is that they missed target dates," the user says. "Perhaps they tried to be too co-operative with early customers."

He adds that the young company concentrated on customizing early releases of the software at the expense of developing a strong generic product. The user claims that SRC did not provide timely product documentation.

"If they go out of business, it'll be something of a disaster," the user adds.

On May 22, Martin Waters was named SRC president and chief operating officer, taking over control of day-to-day operations from Paul Tucker, who had been president and

CEO. Tucker then became chairman and retained his CEO position.

Tucker, a 23-year Honeywell, Inc. veteran, was brought in to run SRC in 1984. Several sources say the sales-oriented approach Tucker brought from Honeywell was not ideally suited to an entrepreneurial company such as SRC, in which product development was the first priority.

"I understand how to get a product from concept to market," Waters says. He previously worked as CEO of Ordain, Inc., a now-defunct Los Angeles-based maker of a relational data base machine. Prior to that, Waters was general manager of the business systems division of Perkin-Elmer Corp.

He says SRC will not need additional cash before year's end, by which time the company's business plan calls for profitability to be achieved through the sale of its software products.

Waters does not rule out the possibility of SRC being acquired to ensure its long-term survival, but he says no negotiations are in progress.

Stecher says a sale could improve the company's prospects. "The investors are pursuing making money. As a company, we would be better off if we could work with a big company — to find a financial sponsor in someone who is closer to our goals than the investors," he says.



SOFTWARE  
RESEARCH  
CORPORATION

## REACH OVER 120,000 ITALIAN COMPUTER PROFESSIONALS.



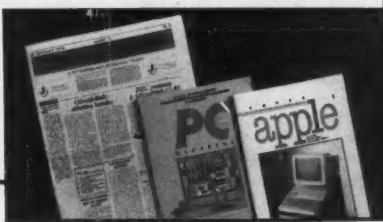
Advertise in CW Communications' Italian publications and sell your products directly to the fourth largest computer market in Western Europe.

Every week, 41,000 MIS/DP executives read *Computerworld Italia*. Modeled after *Computerworld*, its sister publication in the United States, *Computerworld Italia* covers the latest developments in hardware, software, terminals and supply products.

Every month, 50,000 IBM PC users and potential buyers read *PC World Magazine*. The editorial focuses on a wide range of topics including software, hardware, in-depth articles and programs.

And, for the Apple Computer end-user market, we publish *Super Apple* each month.

CW International Marketing Services makes advertising your products in Italy, and around the world, easy. We have over 55 publications in more than 25 countries. For more information call Frank Cutitta, Managing Director, CW International Marketing Services, at (800) 343-6474. Or fill out the coupon below and mail today.

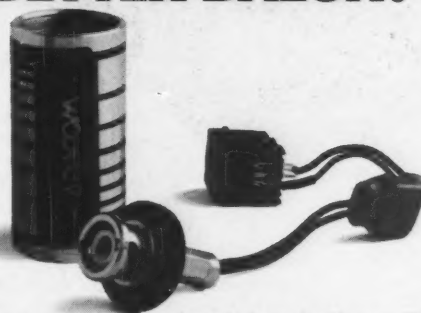


Please send me more information on:  
☐ *Computerworld Italia* ☐ *Super Apple*  
☐ *PC World Magazine*  
☐ Your brochure "The Computer Marketplace in Italy"  
☐ Your other foreign publications

Name \_\_\_\_\_  
 Title \_\_\_\_\_  
 Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

**CW COMMUNICATIONS/INC.**  
 Frank Cutitta  
 Managing Director  
 International Marketing Services  
 CW Communications/Inc.  
 375 Cochituate Road  
 Framingham, MA 01701-9171

## IT TAKES GUTS TO MAKE A BETTER BALUN.



A balun is just a balun, until you look inside. Then you'll see why Adacom baluns carry a full one-year warranty.

First we start by using the highest quality transformers available. Then we put the transformer in a metal, not plastic, casing for extra protection and increased electrical shielding. And we even make them round for easier installation.

The result is the finest balun you can buy.

We offer a full line of coax and twinax adapters, all 100% IBM compatible and all available immediately. Or we can supply custom configurations.

For a better balun at a very competitive price, call us today.

**ADACOM**  
 Your 3270 communications company.

# 1-800-3270ADA

(In Kansas, call 913/888-4999) Adacom Corporation • 8871 Bond Street • Overland Park, KS 66214



## COMPUTER INDUSTRY

## Hogan-IBM wedding bells may sound hollow to bank MIS



**OUTSIDE  
LINES**  
M. Arthur Gillis

**W**hen Hogan Systems, Inc. and IBM announced their marketing agreement in May, the bank MIS community did not

end up with a stronger single-vendor-supported turn-key system. Instead, it got a software package developed and maintained by Hogan and a computer built by IBM. But now the difference is that IBM sells them both.

Whatever happened to the idea that when two complementary organizations pool their resources, the re-

sult is not just the sum of the parts, but something more?

Who will benefit from this new arrangement? Clearly, it is good for Hogan. The stock market proved that. There is no better way to beat the competition than to have IBM affix its seal of approval on a product. Psychologically, this marriage gives the impression that the leading

hardware company has just identified Hogan as the leading bank software company.

What is in it for IBM? Surprisingly, there is just as much psychological impact for IBM as for Hogan. IBM knows that it is not as easy to win anymore as it was in the old days. Its weaker earnings performance last year was the first sign.

IBM cannot just sell iron today, because others can do that even without the polish. Also, IBM's biggest competitor in the banking industry, Burroughs Corp., will get even bigger with the addition of Sperry Corp.

IBM always claimed it was in the solutions business. Now it can demonstrate it with software because, in terms of complexity and work load, 90% of a solution comes from software.

It takes two days to install, test and run diagnostics on an IBM 3090. Add two weeks for systems software testing, and the hardware environment is ready. By comparison, it takes about five years to fully install the Hogan system.

In dollars, that 3090 may have cost the user \$3 million to \$4 million. Total cost to a financial institution for the Hogan system, including implementation, is more than \$6 million.

#### In the bowels of the MIS shop

Although IBM can theoretically offer the total solution, it may only be able to sell that idea in the executive suite. Will IBM be able to perform in the bowels of the MIS shop where the implementation is conducted?

It is doubtful. After 28 years' worth of systems implementation projects and conversions, I have learned to side with the team that learned from actual experience. It takes computer technicians, as well as bank operations professionals, to do a complete job. Where is IBM going to get those people?

Typical IBM systems engineers are great when it comes to MVS/XA, CICS, IMS and generic systems knowledge. But they will be hard-pressed to provide implementation support for one of the most complex applications packages ever developed.

If IBM's contribution is marketing, then one would have to ask why it needs thousands of generic sales reps to sell to fewer than 500 financial institutions. Hogan does not need IBM's sales clout unless it is to rebuild Hogan's credibility.

Every large financial institution knows about Hogan's reputation, based on both its success as well as its failure when it could not deliver. See HOGAN-IBM page 106



### The UNIX Operating System. It is an option no business professional can afford to ignore.

UNIX is a multi-user, multi-tasking operating system which provides you with a unique and innovative menu of business solutions with unparalleled versatility, portability and affordability. You can experience the best UNIX has to offer at UNIX EXPO.

At UNIX EXPO, you can discuss your business requirements with the leading manufacturers and suppliers of UNIX solutions while they demonstrate and describe how the UNIX Operating System will meet the needs of your organization. Interact with the leading professionals at the Conference and come away with a full understanding of UNIX solutions and applications. At the AT&T Tutorials and Computer Labs both new and sophisticated UNIX users will acquire the skills to meet today's technical challenges.

Plan now to attend and profit from the proven UNIX marketplace.

FOR ALL THE DETAILS ON ATTENDING OR EXHIBITING CONTACT:  
NATIONAL EXPOSITIONS CO., INC. 49 WEST 38TH STREET • SUITE 12A • NEW YORK, NY 10018  
TELEPHONE: 212/295-9111 TELEFAX: 135-401 DINCAMM FAX: 212/899-0755

**UNIX EXPO**

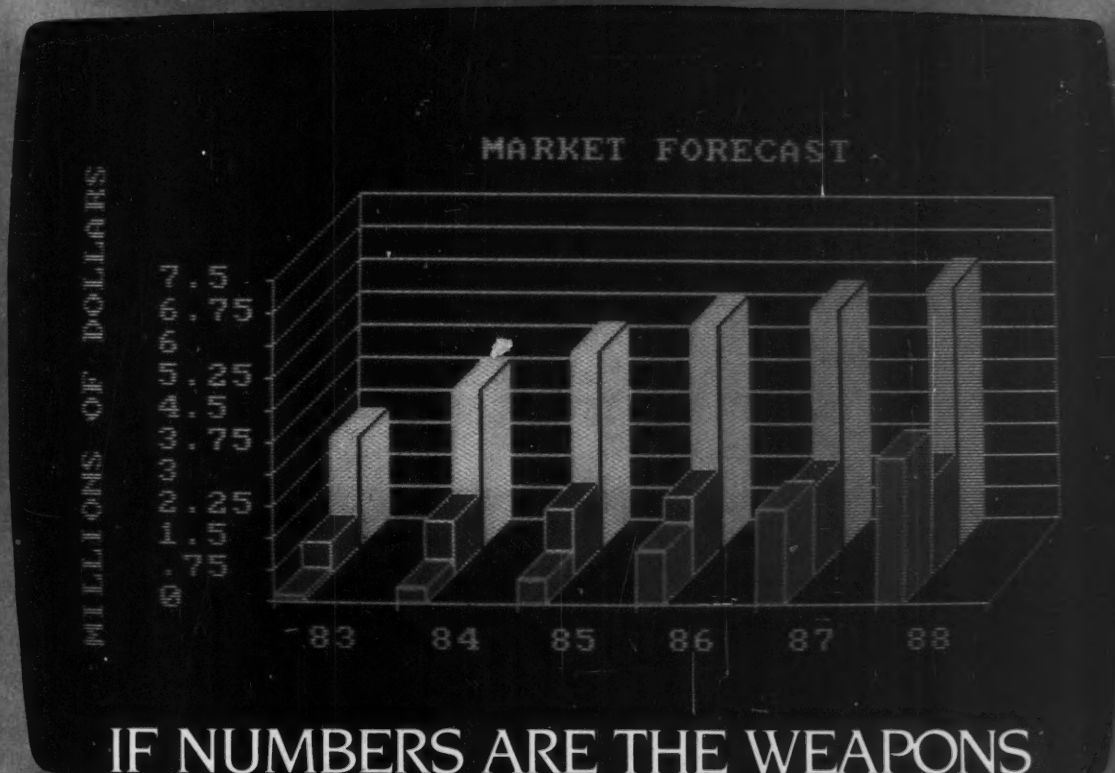
The UNIX Operating System Exposition & Conference

**October 20, 21, 22, 1986  
Jacob K. Javits Convention Center,  
New York City**

UNIX™ is a registered trademark of Bell Labs. UNIX EXPO is not affiliated with Bell Labs.

*Gillis is an Atlanta-based software consultant to large banks and financial institutions. He is a former senior vice-president of Fleet National Bank in Providence, R.I., and the author of several books, including Microcomputers in Financial Institutions.*





## IF NUMBERS ARE THE WEAPONS OF YOUR MARKETPLACE, IT'S TIME YOU GOT A SHERMAN TANK.

Sometimes, "crunching the numbers" simply means making them look good and getting them to the right people on time. And when people are under the gun, they need a printer that can translate their computer's impressive spreadsheet and graphics software to paper. Fast.

That's why a new MICROLINE® 290 series printer is the best weapon in the battle of the numbers.

OKIDATA MICROLINE 290's are faster than other leading printers in their class. And we can prove it. We recently compared the MICROLINE 292 to the IBM® Proprinter and the Epson® FX286.

The other printers require two passes of the printhead to produce crisp, clear Near

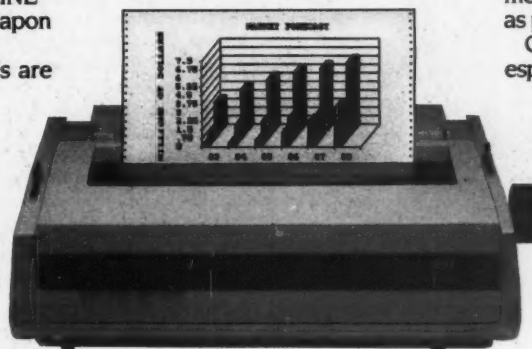
Letter Quality text. But the MICROLINE 292 and wide-carriage 293 feature our unique "Dual Nine" printhead, that needs only one pass. The result? After four hours of continuous Near Letter Quality printing, the Epson printed only 181 pages, the IBM,

215. But the MICROLINE 292 was the clear winner with 545 pages!

The 292 and 293 are winners in other ways, too, with speeds of 200 cps in the Utility mode. Color capability for impressive reports and presentations. Versatile paper handling. And a feature selection menu that's as easy to order from as pointing a finger.

OKIDATA printers are made especially for most PC's. Whether it's an IBM, AT&T®, or Compaq®, OKIDATA is fully compatible.

A slingshot was a terrific weapon once. But it's no match for today's big guns. When the battle lines are drawn, draw on an OKIDATA. Call 1-800-OKIDATA today.



**OKIDATA®**  
an OKI AMERICA company  
We put business on paper.

OKIDATA is a registered trademark of Oki America, Inc.  
Marque déposée de Oki America, Inc.  
MICROLINE is a registered U.S. trademark of Oki America, Inc.  
IBM is a registered trademark of International Business Machines Corp.  
AT&T is a registered trademark of American Telephone & Telegraph, Inc.  
Epson is a registered trademark of Epson Corporation.  
Compaq is a registered trademark of Compaq Computer Co.



## COMPUTER INDUSTRY

# U.S. Sprint revs campaign to ward off heavy competition

**Emphasizes low rates, high fiber-optic quality**

By Mitch Betts

U.S. Sprint Communications Co., which combines the communications units of GTE Corp. and United Telecommunications, Inc., has begun operations with an aggressive marketing campaign that stresses the transmission quality of the company's fiber-optic network.

U.S. Sprint debuted as the No. 3 carrier, behind AT&T and MCI Communications Corp., facing a very competitive and challenging marketplace that its parent companies

found unprofitable.

The partnership merged the GTE Sprint and U.S. Telecom long-distance companies as well as GTE Telenet and United Telecom's data communications units.

"The merger was a smart move, but whether it's a profitable one remains to be seen," said Edward Goldstein, an analyst with the MAC Group, a consulting firm in Cambridge, Mass. "It's very tough to go up against AT&T and MCI in this business."

U.S. Sprint executives said they hope the appeal of low rates and the largest continuous fiber-optic network will help them take customers away from MCI and AT&T perma-

nently. Charles M. Skibo, a member of the office of the president at U.S. Sprint, said the firm aims to increase its 4% share of the long-distance market to 7% by 1988 and better than 10% in the early 1990s.

Edward W. Carter, senior vice-president for sales and marketing, said U.S. Sprint will offer business customers a WATS Plus service with T1 access, virtual banded WATS and Dial-1 WATS. U.S. Sprint also offers the Telenet data network, a virtual private network, electronic mail and other data communications services.

Prices and other details about the services have not been disclosed, but Carter said those details will be announced sometime this month, with

reduced rates effective Aug. 1.

Carter claimed that U.S. Sprint will not only undercut the prices of MCI and AT&T, but will also offer superior quality in voice and data transmissions because of its fiber-optic network. "Price is only half a strategy," Carter said.

Carter said fiber-optic technology reduces static and background noise in long-distance telecommunications and provides security and redundancy features.

U.S. Sprint has in place 5,500 miles of continuous all-digital, fiber-optic cable, the largest continuous fiber network in the U.S. By the end of 1987, the network is scheduled to reach 22,000 miles, according to company officials.

The top executives of U.S. Sprint are J. David Hann, responsible for data communications, and Skibo, responsible for marketing, operations and administration. Prior to the formation of U.S. Sprint, Hann was president of GTE Telenet and Skibo served as president of U.S. Telecom.

Last week, former GTE Sprint President Donald Prigmore voluntarily left U.S. Sprint management for a position with GTE's diversified products group. His departure is expected to strengthen United Telecommunications' role in the management of U.S. Sprint.

## THE GREAT ESCAPE!

FROM IVORY TOWERS AND COLD COMPUTER ROOMS TO THE WARMTH OF YOUR OFFICE.

Artificial intelligence for business has arrived in a revolutionary new product... **Guru.**

At last, artificial intelligence designed especially for business! Guru brings together expert system capabilities of artificial intelligence, the productivity of familiar business computing tools and the ease of communicating with your computer using menus, commands or plain English. All available in a single, integrated program.

Guru works like human experts, considering uncertainties, reasoning through forward and backward chaining, asking for more information when needed, and explaining its recommendations.

Guru's expert system works hand-in-hand with all the familiar business computing tools like spreadsheets, statistical analysis, business graphics and a programming language, always available for both expert consultation and your everyday business computing needs.

Best of all, you won't need to learn LISP or PROLOG or buy fancy computers... Guru runs on your PC and communicates in plain English! Guru is artificial intelligence that means business.

For more information, call or write Micro Data Base Systems, Inc./Marketing & Sales, P.O. Box 248, Lafayette, IN 47902, 317/463-2581, Telex 209147 ISE UR.

# GURU

ARTIFICIAL INTELLIGENCE THAT MEANS BUSINESS.

mdbs, the name of this product and the logo are registered trademarks of Micro Data Base Systems, Inc., P.O. Box 248, Lafayette, IN 47902.

mdbs

## Hogan-IBM bells have hollow ring

From page 104

liver a loan system and an international banking system. But the failures were only relative.

What I believe prospects want to see from Hogan today is not a new marketing representative, but a commitment to applications development, implementation support, ongoing enhancements, customer service and some assurance that its financial integrity will ensure a long, healthy future. Is IBM going to provide these things?

One wonders how these marriages are put together and how long they will last. What kind of a marriage is this? Why didn't IBM just buy the company? Is it because the two want to live together for a while to be sure they are compatible?

Hogan and IBM stated a 20-year agreement between the two firms. Perhaps there was a typographical error in expressing the unit of time. My opinion is that the honeymoon will last for perhaps 20 months.

When vendors begin to focus on user benefits as the basis for their strategies, they may in fact find the key to success. Self-serving positioning to enhance one's image may work for micro software, but it will not impress the sophisticated (defined as previously burned) MIS directors of large financial institutions.

When IBM and Hogan return from their honeymoon, I hope they will live a long, happy life together and have lots of kids. But if Hogan stays in Dallas and IBM stays in Armonk and each continues to do its own thing, I am afraid the second chapter will take place in the divorce court.



# On September 24 we're covering DEC and you can be part of it.

## Announcing the Computerworld Extra on Digital Equipment Corporation.

**F**or several decades, no one has posed a serious threat to IBM's stronghold as the number-one computer manufacturer. But, in the last few years, the company from Maynard, MA, has been quietly consolidating and revamping its product lines, its strategies, its entire organization. And they've set their sights on some very big targets.

In the September 24 Computerworld Extra, we'll take a thorough look at what Digital's got to offer. And why many of the world's large and mid-sized companies are now seriously evaluating DEC.

We'll discuss Digital's strengths. Its top-to-bottom architecture. Its networking and distributed processing philosophies. And the products that connect to IBM — including products that may work better in the IBM environment than IBM's own solutions.

And we'll round out the issue by interviewing Ken Olsen, the man behind the \$7 billion corporation.

The Digital story is fascinating. Must reading for our 128,000 paid subscribers. Plus all are the people who will read our Computerworld Extra as it's passed on down the hall. Including large numbers of readers at more than 95% of Digital's installed base of large and mid-sized companies. Plus a major share of the IBM installed base.

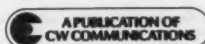
Extra copies will also be distributed at DEXPO West '86, Oct. 7-10, in San Francisco.

So, if you've got a product or service that's DEC compatible — or an alternative — our Extra gives you a tailor-made audience. But hurry, closing is August 15.

To reserve space, call Ed Marecki, Vice President/Sales, at (617) 879-0700, or your local sales representative. Call today.

## COMPUTERWORLD

<b>Boston</b> (617) 879-0700	<b>New York</b> (201) 967-1350	<b>Atlanta</b> (404) 394-0758	<b>Chicago</b> (312) 827-4433	<b>Dallas</b> (214) 991-8366
<b>San Francisco</b> (415) 421-7330		<b>Los Angeles</b> (714) 261-1230		





**IN 1972,  
WE DECIDED  
CHROMIUM DIOXIDE  
WAS THE PERFECT  
MAGNETIC MEDIUM.**

**IN 1985,  
IBM AGREED.**

In 1985, IBM announced the new 3480 drive that gave us the first dramatic change in computer tape media in thirty years. But the incredible performance of this new tape...six times the recording density of conventional reel-to-reel tape...depends on the latest Chromium Dioxide ( $\text{CrO}_2$ ) particle technology. And BASF has pioneered in this technology for thirteen years. We're the world's largest producer of  $\text{CrO}_2$  particles, and have more continuous experience with  $\text{CrO}_2$  magnetic tape than any other company.



So, while we thank IBM for the inspiration (and specs) for our new Model 480 Tape Cartridges for the 3480 drive, you can thank us for the major role we played in pioneering the  $\text{CrO}_2$  medium.

Backed by a 5-year warranty, BASF Model 480 Tape Cartridges are now available in quantity for immediate delivery. When the data you'll need tomorrow depends on the tape you choose today, your long-term choice is BASF.



**BASF**



## COMPUTER INDUSTRY

## IBM, Cybernexus dispute settled

From page 134

est in Xerox Corp.'s disk drive subsidiary, Century Data Systems Co. of Anaheim, Calif.

The pending deals, while not mandated by the IBM settlement, will enable Cybernexus to remain in business as a disk drive vendor after divesting its thin-film head operation.

A Cybernexus spokesman said the firm agreed to the IBM settlement to end what has been a costly and lengthy litigation process. "It was the best option available, and we're not admitting to the allegations," he said.

Disk drive industry analyst James

Porter of Disk/Trend, Inc. in Santa Clara, Calif., called Cybernexus' moves "a marvelous save" despite the firm's forced departure from the thin-film head business.

"The firm took a broadside from IBM, and suddenly it has a profitable operation in Century Data," Porter noted.

### IBM trade secrets

In its 3-year-old suit, IBM claimed that when Cybernexus Chief Executive Officer William Klein and four other founders left Big Blue, they took trade secrets relating to thin-film recording head technology used in the high-capacity hard disk drives.

IBM contended that Cybernexus, six months after the firm's inception, possessed a production process "virtually identical" to its own, a process that had taken IBM 14 years and

\$200 million to develop.

Cybernexus agreed to stop manufacturing and marketing thin-film recording heads that use or rely on IBM trade secrets. Cybernexus must also reimburse salaries paid to Cybernexus' founders for the period of time before they left IBM.

Spokesmen for IBM and Cybernexus declined to elaborate on the payment terms, citing a confidentiality agreement.

### Combining units

Cybernexus said it would combine Xerox's 8- and 14-in. disk drive unit, Century Data, long rumored to be on the block, with its affiliate Cybernexus Advanced Storage Technology, a maker of high-capacity 5¼-in. hard disk drives.

A Xerox spokesman said Xerox would retain a small interest in the

combined company but declined to quantify the amount.

The spokesman added Xerox was selling control of Century Data as part of its 2-year-old strategy to reduce its involvement in the OEM peripherals business.

The firm recently sold a 90% stake in its Optimum optical disk drive subsidiary to Cipher Data Corp. and has divested pieces of its Shugart disk drive operation to two separate Asian concerns during the past two years.

Under terms of the Read-Rite merger, production of Cybernexus products will be converted to Read-Rite's process in a 12-month phase-in period. IBM has signed a covenant not to sue Read-Rite after determining Read-Rite's manufacturing process does not infringe on IBM patents.

## Old countries, new markets

From page 134

firms. European capital spending, Altman notes, has yet to reflect the worldwide decline in oil prices and will not do so until near year's end.

Well positioned to cash in on European market growth, DeMarcellac says, are West Germany's Nixdorf Computer AG and Siemens AG, Italy's Ing. C. Olivetti & Co. and two U.S. vendors, IBM and DEC.

At DEC, Mark Steinkrauss, director of investor relations, says the international sector contributed

”

*The international sector's contribution to Digital Equipment Corp. revenue at the end of the third quarter was 40.4%. For the same period in the last two fiscal years, it was only 35%.*

42.7% of DEC's \$82.7 million revenue in the third quarter ended March 31. Steinkrauss notes international sales make up a greater proportion of DEC revenue in the third quarter than in any quarter he can recall in his eight years with the company.

For the nine-month period ending with that quarter, the international sector's contribution to DEC revenue was 40.4%. For the same period in the last two fiscal years, it was only 35%.

While Steinkrauss is not able to break out European sales from overall international revenue, he notes that Europe is a strong market in which DEC has seen particular success making sales to the banking and financial services sector.

European sales are often an overlooked part of the DEC success story that has been the talk of the industry for the last nine months. For other firms still adrift in the doldrums of the U.S. computer market, it is a lesson well worth learning.

## Plug Any ASCII Async Printer Into IBM 3274

Local Data's newest InterLynx/3287 gives you immediate host access and 3287/3289 emulation.

Now you can use virtually any asynchronous printer any place you can plug in an IBM 3287...

Connect an HP Laser Jet, Xerox 2700, NEC Spinwriter, Epson FX-80, Okidata/ML92, or an IBM Proprinter to your mainframe host.

The choice is yours from hundreds of brands and models with baud rates to 19.2K bps and parallel print rates to 26 pages-per-minute!

This newest InterLynx/3287 is easy to install. Configure it from virtually any async terminal connected to the serial port or use the convenient front panel.

(Options are stored in non-volatile EEPROM.)

### What's New?

- Printer setup strings are now user definable, making it easier to work with laser printers.
- Pseudo-transparency triggering is now user definable and allows taking direct control of the ASCII printer generating computer graphics, alternate character sets and other device unique outputs.
- Print rates are now up to 26 pages-per-minute.
- Translation tables are now easily user modified.
- Xerox's SNA SCS code 36 is now supported.

### But Some Things Don't Change.

InterLynx/3287 is still an easy to use printer interface connecting inexpensive ASCII async printers to IBM 3274. It's easily connected to the host and for pennies a day gives steady, reliable service.

More than 7,000 InterLynx/3287s are in use worldwide. They're backed by a 12 month warranty and an experienced tech support team. Get the full story today. Call (213) 320-7126 for more information and the name of your nearest factory representative. In Canada call (613) 748-9751. In UK call (0753) 76537.

"Your Lynx® to IBM"

**LOCAL DATA**

2771 TOLEDO STREET, TORRANCE, CA 90503 TLX 182288

IBM is a trademark of International Business Machines Corporation. HP is a trademark of Hewlett-Packard Company. NEC is a trademark of NEC Corporation. Epson is a trademark of Epson America, Inc. Xerox is a trademark of Xerox Corporation. OKI is a trademark of OKI America, Inc.



# "The machine-specific books were not enough, so we decided to try Computerworld. The result was immediate."

David W. Smith  
Marketing Services Manager  
EMC Corporation  
Natick, MA



EMC Corporation manufactures add-in memory and peripheral controllers for IBM, DEC, Hewlett-Packard, Prime and Wang minicomputers and sells them directly to computer users. So the company decided to spread the word to MIS/DP directors by advertising in vendor/machine-specific publications and in Computerworld. Says David W. Smith, Marketing Services Manager for EMC, Computerworld was chosen for two reasons.

First, EMC selected Computerworld to reinforce the company's message in the minds of readers of machine-specific books and to get to the readers who didn't see the ads in other publications. "One of our product managers pleaded for greater visibility and recognition for his products — the machine-specific books were not

enough," recalls David. "So we decided to try Computerworld, and the result was immediate."

The second reason is that David has seen Computerworld ranked as the best MIS/DP multivendor book in machine-specific readership studies.

"So many DP shops use more than one machine," he adds. "Computerworld addresses all markets, and we're getting responses in all five of our vendor categories."

Since EMC started advertising in Computerworld, the number of phone inquiries actually doubled, David revealed. "When an ad appears in Computerworld, business picks up tremendously. In fact, Computerworld is responsible for some of our more spectacular success stories," he adds. "Business

is coming directly from those ads; people are calling and ordering, and that's something you don't find very often in this business. One caller actually ordered three boards after reading our ad in Computerworld."

Computerworld. We're helping more suppliers reach more buyers more often in the computer market. We cover the entire computer world. Every week. We deliver the news, the analysis and the audience. Just ask David.

Call your Computerworld representative for all the facts. Or call Ed Marecki, Vice President/Sales, at (617) 879-0700.

IBM is a registered trademark of International Business Machines. DEC is a trademark of Digital Equipment Corporation. Hewlett-Packard is a registered trademark of Hewlett-Packard Company. Prime is a registered trademark of Prime Computer, Inc. Wang is a registered trademark of Wang Laboratories, Inc.

BOSTON/(617) 879-0700. NEW YORK/(201) 967-1350. CHICAGO/(312) 827-4433.  
ATLANTA/(404) 394-0758. DALLAS/(214) 991-8366. LOS ANGELES/(714) 261-1230.  
SAN FRANCISCO/(415) 421-7330.





# MICRO DIRECT SHOPPER

## GREAT SOFTWARE AT MODEST PRICES

Some samples from our library of over 500 disks for the IBM PC and compatibles:

**Desk Organizer** A great pop-up helper, phone dialer, note pad, calendar, and calculator.  
☐ 405 Deskmate—More than a deskclock ..... \$6

**Communications**  
☐ 310 Omnidisc—fast with windows ..... \$6  
☐ 212, 334 Set up a BBS system ..... \$12

**Draw on your computer screen.**  
☐ 344, 345 PC Key Draw (graphics req.) ..... \$12

**Spreadsheets**  
☐ 199 PC-Calc—simpler than Lotus ..... \$6

**Powerful database management programs**  
☐ 5 PC-File III—Labels, forms, letters ..... \$6

**Word processing**  
☐ 78 PC-Write, popular and powerful ..... \$6  
☐ 388 100 form letters on disk ..... \$6  
☐ 194 PC-Read, computes level of text ..... \$6  
☐ 379 Wordstar utilities ..... \$6  
☐ 480 PC-Outline, creates an outline ..... \$6

**Artificial Intelligence languages**  
☐ 417 Prolog ..... \$6  
☐ 148 XLSF—version of Lisp ..... \$6  
☐ 398 ESI, expert system generator ..... \$6

**Games—The most interesting games on**  
 or off Earth.  
☐ 293 Arcade Games (color graphics req.) ..... \$6  
☐ 390 Fight and others (graphics req.) ..... \$6  
☐ 354 PC-Jack games ..... \$6  
☐ 292 Spacewar, great on Hercules card ..... \$6  
☐ 476 Patrick's Best Games (mostly mono) ..... \$6

**Recover lost files—File examiners/repair utility**  
 (floppies only)  
☐ 133 Ultra Utilities, similar to Norton's ..... \$6

**DOE Help and explanations for the new user.**  
☐ 254 PC-DOE Help ..... \$6  
☐ 403 Computer Tutor learn PC-DOE ..... \$6

**Housekeeping—Our favorite utilities.**  
☐ 478 Hard disk utilities, WHEREIS and more ..... \$6

**Unprotected popular software**  
☐ 414 Routines to disable copy protection ..... \$6

**Financial**  
☐ 164 Contrac, personal finances ..... \$6

**For more software than you ever thought possible.**  
☐ 350-page directory (disks 1-300) ..... \$8.95  
☐ Supplement (disks 301-500) ..... \$3.95

**PC-SIG Membership**—Includes directory, supplement, newsletters, and more.  
☐ PC-SIG 1 yr. Membership (\$35 foreign) ..... \$20  
 Choose one: ☐ Printed ☐ On disk directory

**SPECIAL**  
**Any 5 Disks plus Directory, Supplement and 1-Year Membership**  
**Only \$39 (Reg \$50)**

**Most programs have documentation on disk and**  
 request a donation from satisfied users. Please add \$4 postage and handling per order (\$10 foreign).  
 California residents add state sales tax.

Total Enclosed \$  
 by ☐ Check ☐ VISA ☐ MC  
 Card No. \_\_\_\_\_

Exp. date \_\_\_\_\_ Signature \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

**PC-SIG** To order, call 800-246-4717  
 in CA 800-222-2296  
 For technical questions or  
 local orders: (408) 736-6291  
 1030-D East Duane Avenue Sunnyvale, CA 94086  
 Dealer inquiries invited F108



“When we brought out the PC's Limited 286<sup>™</sup> with its 8 MHz option included, it was hailed as a technological breakthrough. And with 1,024K RAM on the motherboard, serial and parallel ports built in, and the wide range of options we provide, it became a smash success at \$1,995.

Now we're breaking the \$1,500 barrier for IBM PC-AT<sup>™</sup> compatibility, with our new price: \$1,495. And remember, every PC's Limited computer we sell comes with a 30-day Money Back Guarantee of your satisfaction.”

—Michael Dell, President

At \$1,495, the PC's Limited 286<sup>™</sup> includes an 80286-based system unit running at 6 MHz and 8 MHz (keyboard-switchable); 1024K RAM on the motherboard; 1.2 meg floppy-disk drive; combined floppy/hard-disk controller card; AT-style keyboard; 192-watt power supply; 2 serial ports and 1 parallel port; clock/calendar with battery backup; and 6 expansion slots. The unit has the same bus configuration as the IBM PC-AT. It runs all major software written for the IBM PC, PC-XT and PC-AT and carries a one-year Limited Warranty.

We offer a wide range of options to complete your system.

All prices are subject to change without notice.

Some quantities may be limited. PC's Limited sells equipment certified to be compliant with FCC Class B standards.

## PC'S LIMITED

SALES CALLS OUTSIDE TEXAS, 1-800-426-5190

SALES CALLS INSIDE TEXAS, 1-800-252-8336

1611 Headway Circle, Building 3, Austin, Texas 78754

Sales Calls from anywhere in the country, (512) 339-6962

Technical Support Calls, (512) 339-6963 or PC's Limited BBS (512) 339-6127

Customer Service Calls, (512) 339-6964 and MCI MAIL: PC's Limited

Telex No. 930300306 PC LTD FAX (512) 339-6721

**- SCREENIO 2.0 -**  
 Realia COBOL screens are a snap with SCREENIO 2.0!  
 Buy Realia COBOL (\$995) and SCREENIO (\$400) from us and get \$100 off or a free Kredit.  
 Or, ask us for a FREE demo disk.

**NORCOM**  
 Post Office Box 897  
 Juneau, AK 99803-0897  
 (907) 780-6464  
 Telex: 5106014051 NORCOM  
 Qualified companies can try SCREENIO for free! Call us.

## Wanted IBM PC XT AT

- Used or New Surplus
- No deal too large or too small - we do it all.

**The Computer Traders, Inc.**  
 2282 NW Pkwy., Suite L  
 Marietta, GA 30067  
 404-860-9233

## Custom Cables

RS232 • Parallel • 422  
 Coaxial • Dual Wieg • 449  
 Twinaxial • Ethernet  
 Mod Plug • V.35 • Berg  
 Ribbon • Din • RCA  
 Connector Parts  
 Bulk Cable • Tools

**Communication Cable Company**  
 P.O. Box 600, Wayne, PA 19087  
 215-844-1900



## COMPUTER SOLUTIONS FOR YOUR BUSINESS

Specializing in AT&T Single & Multiuser Systems

- UNIX/XENIX or DOS
- Customized Systems
- Manufacturing, retail point-of-sale, financial, etc.



**FCG Information Systems Inc.**  
 11633 E. Rosecrane Ave.  
 Norwalk, CA 90650  
 213-929-8891 CA 800-624-2499  
 Nat'l 800-523-1788

## TOSHIBA-IBM COMPATIBILITY

P341 P351 P321 P1340 P1351 P1350

Now you can make your Toshiba printer totally compatible with the IBM (and compatibles) in both text and graphic modes. IDT's IBM-Toshiba Printer Interface has Epson emulation with Toshiba quality.

- memory resident software interface (compatible with most other memory resident packages)
- supports downloadable fonts even on P1340 and P1350
- prints IBM upper ASCII characters (borders, Greek, math, etc.)
- screen dumps both text and graphics
- complete graphics compatibility with most software
- font design capability
- versatility beyond compare - all in one program!

You can accomplish all this and more for only \$79.95 (\$2.50 shipping & handling). MC/VISA  
**INTEGRATED DATA TECHNOLOGIES, INC.**  
 4775 Bunchberry Lane, Colorado Springs, CO 80917  
 (303) 498-2883



**SPECIAL OFFER:**  
 Buy 1 interface and get IDT's FileManager disk utility for only \$19.95 (for a limited time only)



# Hardware and software for the business PC.

✓ denotes IBM-AT compatibility.

## SOFTWARE

We only carry the latest versions of products. Version numbers in our ads are current at press time.

<b>Alpha Software (not copy-protected)</b>	
Keyworks 2.0	\$49.
<b>Ashken-Tate (copy-protected)</b>	
dBase III Plus 1.0	call.
Framework II 1.0	call.
<b>Best Programs (not copy-protected)</b>	
PC/Tax: Cut (1986 version for 1985 taxes)	119.
PC/Fixed Asset System 3.1	299.
<b>Bible Research (not copy-protected)</b>	
THE WORD 3.1 (KJV Bible)	159.
THE WORD 3.1 (NIV Bible)	159.
<b>Borland International (not copy-protected)</b>	
Turbo Tutor 1.0	19.
Turbo Database Toolbox 1.2	33.
Turbo Graphix Toolbox 1.0	33.
Turbo Editor Toolbox 1.0	41.
Turbo Gameworks 1.0	37.
Turbo Newpak (Gameworks and Editor)	52.
Turbo Lightning	57.
Sidekick 1.5	49.
Traveling Sidekick (reg. Sidekick)	45.
Traveling Sidekick w/Sidekick	73.
Reflex 1.1	59.
Superkey 1.1	41.
Superkey/Sidekick Package	67.
Turbo Pascal 3.0	41.
Turbo Prolog 1.0	65.
Turbo Holiday Pack (Pascal 3.0, Tutor, and Database Toolbox)	67.
Turbo Family Jumbo Pack (Pascal 3.0, Database, Editor & Graphix Toolboxes, Tutor and Gameworks)	135.
<b>Breakthrough (not copy-protected)</b>	
Timeline 2.0	239.
<b>Broderbund (copy-protected)</b>	
Graphics Library 1	22.
Print Shop	35.
<b>Computer Associates (not copy-protected)</b>	
SuperCalc 3 Release 2.1	call
<b>Dac Software (not copy-protected)</b>	
Dac Easy Accounting	45.
<b>Evergreen (not copy-protected)</b>	
One Write Plus 1.01	159.
<b>Executive Systems (not copy-protected)</b>	
XTREE 2.0 (file & directory manager)	37.
<b>5th Generation (copy-protected)</b>	
Fastback 5.03	97.
<b>Funk Software (not copy-protected)</b>	
Sideways 3.11	39.
<b>Infocom (not copy-protected)</b>	
Cornerstone 5.1	65.
<b>Lifeline (not copy-protected)</b>	
Volks writer 3.1.0	147.
<b>Living Videotext</b>	
Think Tank 2.1 (copy-protected)	105.
Ready 1.0 (not copy-protected)	49.
<b>Micro Education (MECA) (copy-protected)</b>	
Managing Your Money 2.0	115.
<b>Micropro (not copy-protected)</b>	
WordStar 3.31	179.
WordStar 2000 Plus Release 2	285.
<b>Microrim (not copy-protected)</b>	
Extended Report Writer 1.3	85.
Cloud 2.0	135.
R-base 5000 1.01	359.
R-base 5000 Multi-user 1.0	719.
<b>Microsoft (not copy-protected)</b>	
Multiplan 2.0	119.
Microsoft Word 3.0	247.
Windows 1.01	65.
Quick Basic 1.02	69.
Project 2.0	239.
<b>Microstuf (not copy-protected)</b>	
Crosstalk XVI 3.61	95.
Remote 1.3	95.

## Migent Software (not copy-protected)

Ability 1.0A	\$65.
MultiMate International (not copy-protected)	call
MultiMate Advantage 3.6	269.
<b>Nantucist Software (copy-protected)</b>	
Clipper (Winter '85 version)	349.
<b>Paperback Software (copy-protected)</b>	
VP-Planner 1.0	57.
<b>Peter Norton (not copy-protected)</b>	
Norton Commander 1.0	36.
Norton Utilities 3.1	59.
<b>Quarterdeck (not copy-protected)</b>	
DESQView 1.2	65.
<b>Satellite Software (not copy-protected)</b>	
WordPerfect 4.1	239.
<b>Software Group (not copy-protected)</b>	
Enable 1.1	call
<b>Software Publishing (copy-protected)</b>	
PPS:File B.01	84.
PPS:Write C.01	84.
Harvard Total Project Manager 1.1	289.
Not copy-protected versions due to be released soon—call.	

## TRAINING

<b>ATI (copy-protected)</b>	
<b>SKILL BUILDER PROGRAMS</b>	
Intro and How to Use:	
Data Bases	MS-DOS
Compaq	PC-DOS
IBM-PC	BASIC
each 33.	
<b>TRAINING POWER PROGRAMS</b>	
How to Use:	
dBase II	dBase III
Multiplan	Framework
WordPerfect	Symphony
each 43.	
<b>Individual Software (copy-protected)</b>	
The Instructor II	26.
Professor DOS	33.
Tutorial Set (both items above)	49.
Typing Instructor	26.
Training for Lotus 1-2-3 (for vers. 1A & 2)	37.
Training for dBase III	37.

## HARDWARE

Manufacturer's minimum limited warranty period is listed after each company name. Some products in their line may have longer warranty periods.

<b>AST Research (1 to 2 years)</b>	
SixPakPlus 64k includes Sidekick vers. 1.5	169.
not copy-protected & DESQView	219.
SixPakPlus 384k (fully populated)	579.
AST-6251-T1	579.
AST-3780	369.
Advantage 128k	call
RAMpage! upgrades to 2Mb	call
RAMpage! AT upgrades to 2Mb	call
Both RAMpage boards support EMS and fully support EEMS.	
<b>Amdtek (2 years)</b>	
Video 310A mono monitor (amber)	159.
Color 722 RGB (EGA compatible)	519.
<b>Curtis (lifetime)</b>	
<b>ACCESSORIES</b>	
Low Profile Tilt and Swivel Pedestal	25.
PC Pedestal (for IBM Mono or Color)	27.
Portable Pedestal (for portable computers)	36.
Printer Stand	18.
System Stand (for IBM-PC & XT)	19.
Universal System Stand	25.
<b>CABLES</b>	
Smartmodem to IBM Cable	17.
Keyboard Extension Cable (3 to 9 feet)	27.
Extension Cables for IBM Mono Display	33.
<b>SURGE SUPPRESSORS</b>	
Diamond (6 outlets)	29.
Emerald (6 outlets; 6 ft cord)	36.

Sapphire (3 outlets; EMI/RFI filtered)	\$47.
Ruby (6 outlets; EMI/RFI filtered; 6 ft cord)	55.
Command Center	SPECIAL
DCA (1 year)	79.
Smart Alec	639.
Irma	769.
<b>Epson (1 year)</b>	
We are an authorized Epson service center.	
LX-80 printer (80 column)	call
FX-85 printer (80 column)	call
FX-286 printer (136 column)	call
LQ-800 printer (80 column)	call
LQ-1000 printer (136 column)	call
<b>Hayes (2 years)</b>	
Smartmodem 300	139.
Smartmodem 1200	389.
Smartmodem 1200B (w/Smartcom II)	349.
Smartmodem 2400	579.
Smartmodem 2400B (w/Smartcom II)	539.
Smartcom II 2.1 (software)	69.
<b>Hercules (2 years)</b>	
Hercules Color Card (parallel port)	159.
Hercules Graphics Card (parallel port)	299.
<b>Intel (chips: 1 year; boards: 5 years)</b>	
Above Board PC 64k (upgrades to 2 Meg)	call
Above Board AT 128k (upgrades to 2 Meg)	call
Above Board PS 64k C/S/P (upgrades to 1.5 Meg)	call
8087 (for IBM-PC & XT)	129.
8087-2 (works on 8 MHz computers)	177.
80287 (for 6 MHz IBM-PC AT)	225.
80287-8 (for 8 MHz IBM-PC AT)	269.
<b>Kensington Microware (1 year)</b>	
Masterpiece	94.
<b>key tronic (90 days)</b>	
5151 keyboard (deluxe)	169.
5153 keyboard (with touch pad)	279.
<b>Mouse Systems (3 years)</b>	
PC Mouse with PC Paint+	139.
PC Mouse with Ready and PC Paint+	149.
<b>NEC (90 days)</b>	
Multisync monitor (EGA compatible)	549.
<b>Orchid Technologies (1 to 2 years)</b>	
Conquest Multisync Board 2k upgrades to 2Mb, fully supports LOTUS/INTEL expanded memory specification (EMS)	264.
Tiny Turbo 286	459.
PC Turbo 286 w/1 Meg	749.
<b>Eccell Multifunction Board for the AT 2k</b>	
upgrades to 1 Meg, fully supports LOTUS/INTEL expanded memory specification (EMS) and Error Correction Code (ECC), serial and parallel ports optional	399.
<b>Paradise Systems (1 year)</b>	
Color/Mono Card	149.
Modular Graphics Card	275.
<b>Princeton Graphics (1 year)</b>	
MAX-12E Amber monochrome monitor	179.
HX-12 RGB monitor (690 x 240)	449.
<b>Quadram (1 to 2 years)</b>	
Expanded Quadboard 2k (upgrades to 384k)	169.
384k (fully populated)	219.
Silver Quadboard 2k (upgrades to 576k)	249.
<b>Microfazer Printer buffer (parallel) w/copy</b>	
MP 64 (64k) upgrades to 512k	159.
QuadEGA+ (half-card)	369.
<b>SMA (20-day money-back guarantee)</b>	
PC-Document Keyboard Templates	
available for:	
DOS/Basic 2.0-2.1	SuperCalc 3
DOS/Basic 3.0-3.1	WordStar
Lotus 1-2-3	WordStar 2000
Symphony	Turbo Pascal
Framework	WordPerfect
dBase II	dBase III
MultiMate	each 12.
<b>Toshiba (90 days)</b>	
All Toshiba printers listed are 24 pin dot matrix.	
P321 serial/parallel printer (80 col.)	519.
P351 serial/parallel printer (136 col.)	1089.
<b>Video 7 (2 years)</b>	
VEGA (half-card)	369.

## DRIVES

<b>IONEGA (90 days)</b>	
Bernoulli Box 20 Meg w/PC2 card	\$1999.
10 Meg cartridge	51.
Bernoulli Box 40 Meg w/PC2 card	2499.
20 Meg cartridge	69.
<b>Mountain Computer (1 year)</b>	
Drive Card 20 Meg	call
<b>PC Connection (1 year)</b>	
20 Meg Hard Drive Card	489.
<b>Seagate (1 year)</b>	
20 Meg Internal Hard Drive (w/controller and cables)	449.
<b>Toshiba (90 days)</b>	
PC, XT 360k Drive (5 1/4" half-height)	109.
AT 360k Drive (5 1/4" half-height)	117.

## MEMORY

<b>64k Memory Upgrade Set for IBM-PC or XT</b>	
system board or any memory board	
150 nanosecond (set of 9)	15.
200 nanosecond (set of 9)	12.
<b>128k Memory Upgrade Set for IBM-AT</b>	
System Board (9 chips piggybacked)	39.
<b>256k Memory Upgrade Set for any</b>	
IBM-AT memory board (9 chips)	39.

## DISKS

All disks have a lifetime warranty.	
<b>DS/DD Disks for the PC &amp; XT (40 TPI).</b>	
10 disks per box	
Verbatim Datalife	17.
Maxell MD-2	19.
<b>DS/High Density Disks for the AT (96 TPI).</b>	
10 disks per box	
Fuji	27.
Maxell	34.
Verbatim	34.

Flip Sort (holds 75 disks)	15.
Floppicleene Disk Drive Cleaner (5 1/4")	18.

## OUR POLICY

- We accept VISA and MASTERCARD. (Only on U.S. & Canadian orders.)
- No surcharge added for charge orders.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order.
- No sales tax.
- All shipments insured; no additional charge.
- Allow 1 week for personal and company checks to clear.
- UPS Next-Day-Air available.
- COD max. \$1000. Cash or certified check.
- 120 day limited warranty on all products.\*
- To order, call us anytime Monday thru Friday 9:00 to 9:00, or Saturday 9:00 to 5:30. You can call our business offices at 603/446-3383 Monday through Friday 9:00 to 5:30.

## SHIPPING

**Note:** Accounts on net terms pay actual shipping. **Continental US:** For monitors, printers, and drives, add 2% for UPS ground shipping. Call for UPS Blue or UPS Next-Day-Air. For all other items, add \$2 per order to cover UPS shipping. We will automatically use UPS 2nd-Day-Air at no extra charge if you are more than 2 days from us by UPS ground. **Hawaii:** For monitors, printers, and drives, actual UPS Blue charge will be added. For all other items, add \$2 per order. **Alaska and outside Continental US:** Call 603/446-3383 for information.

**1-800-243-8088**



**PC Connection**  
6 Mill Street  
Marlow, NH 03456  
603/446-3383

825 T

For the IBM-PC (XT & AT) exclusively.

# PC CONNECTION

\* DEFECTIVE SOFTWARE REPLACED IMMEDIATELY. DEFECTIVE HARDWARE REPLACED OR REPAIRED AT OUR DISCRETION. SOME ITEMS HAVE MANUFACTURERS WARRANTIES UP TO FIVE YEARS. ALL ITEMS SUBJECT TO AVAILABILITY. PRICES SUBJECT TO CHANGE WITHOUT NOTICE.



# Jubilation

## Word-a-holics unite!

Trying to decide which word processor to buy is like trying to decide which college to go to. The decision will change your life forever, but you may never know if it was the best one. Here are five tried and proven professional packages.

They all have spell checkers. None are copy-protected. And hard drives are recommended for all. See PC Magazine 1/28.



**MultiMate Advantage 3.6 with GraphLink and On-File** ..... \$289  
Originally designed to emulate the Wang word processor, MultiMate is often referred to as the corporate word processor. It offers sophisticated networking capabilities, and, with two free-for-a-limited-time software programs (GraphLink and On-File), also has built in graphics and database.

**Microsoft Word 3.0 with Outline** ..... \$247  
With a mouse and a graphics card, Microsoft Word lets you move words around without touching the keyboard, and see what you got without squinting. Without a mouse or a graphics card it's still a powerful word-processor, with "Style Sheets" that simplify formatting, and a built-in outline program.

**WordPerfect 4.1** ..... \$239  
We have a friend who writes for computer magazines. At one time or another he has used and reviewed virtually every major word processor. He now swears by WordPerfect and swears at all the others. Use this program for a while and you'll be able to touch type most of your commands with your eyes closed and your right hand tied behind your back.

**WordStar 2000 Plus Release 2** ..... \$285  
WordStar has had some trouble shedding its image as the lumbering dinosaur of the microcomputer age. But hundreds of thousands of people use it. There are a lot of programs out there to back it up. And this new version gives it the same advanced features as any top-quality word processor. Even the control keys are starting to make some sense.

**Volkswriter 3.0** ..... \$147  
Solid performance with a reasonable price continues to be Volkswriter's claim to fame. It's fast, and boasts one of the original what-you-see-is-what-you-get screens. With the new version's spell checker and more sophisticated print formatting, it is now able to compete functionally with the other high-end word processors. (Our new low price is pretty persuasive too).

## Buy one. Get two.



Hey, got a friend? Don't know? Check your database! What? No database? Have we got a deal for you (and your friend). Until June 30, Microrim will send you a complete second copy of R-base 5000 free when you send in your warranty card and a copy of our sales invoice. So you can get together with your friend, split the cost for one and get two! Or, you can keep the extra copy at home, at a branch office, or down the hall. R-base 5000 is easy to learn and operate, and has the custom reporting features most users need. Remember, the two for one offer is only good from April 15 till June 30.

**R-base 5000** ..... **\$359**  
(Additional R-base 5000 from Microrim) ..... \$Free

## Chips

Fully tested, factory fresh 9-chip sets from the leading chip manufacturers, such as TI, Samsung, NEC, Hitachi, Oki, etc. All chips and chip sets come with complete instructions.

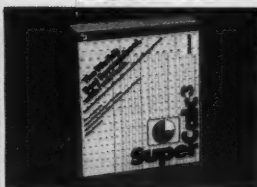
<b>64K</b> (200Ns)	<b>\$12 ea. set</b>
<b>64K</b> (150Ns)	<b>\$15 ea. set</b>
<b>128k</b> or <b>256k</b> (150Ns)	<b>\$39 ea. set</b>

## Bernoulli Berserk!

We've got a problem. The prices we're able to offer on Bernoulli boxes are changing about 10 times faster than we can change this ad. Probably because the machines are selling about 10 times faster than anyone ever dreamed they would. The 20 Meg and 40 Meg versions feature two 1/2 height drives with removable cartridges. There's a 90 day warranty, and we're an authorized Bernoulli service center—turn-around on repairs is usually 24 hours. Here are our latest up-to-date-but-probably-obsolete-by-now prices!

<b>Bernoulli Box 40 Meg</b> .....	<b>\$2499</b>
Additional 20 Meg Cartridges .....	\$69
Bernoulli Box 20 Meg .....	\$1999
Additional 10 Meg cartridges .....	\$51
Bernoulli Care Kit .....	\$79

## Supercalc ifragilistic!



SuperCalc 3 is the kind of product that you'd be proud to bring home to your mother. Like Lotus 1-2-3 it offers spreadsheet, information management and presentation graphics. But it only needs 128k of RAM, and is not copy-protected. It also is compatible with the Hercules Monochrome Card, as well as the Enhanced Memory (EMS) and Enhanced Graphics (EGA) standards. And you get a free copy of Sideways, the program that lets your printer think horizontal is vertical.

**SuperCalc 3 2.1**  
(with Sideways) .....  
**30% off our usual unusual low price—call!**

## SixPakPlus Minus\$!



AST is so wrapped up in Enhanced Memory and other arcane subjects that they've been letting the price slip on their original claim to fame—the AST SixPakPlus, one of the original and best multifunction cards. So if you're just starting in computing, or outfitting a second unit for home, now's a great time to buy this basic piece of hardware. You get a clock calendar, serial port, parallel port, up to 384k of memory, and copies of two classic unprotected programs—Sidekick 1.5 and DESQView. A genuine deal.

**SixPakPlus 64k** ..... **\$169**  
**SixPakPlus 384k**  
(fully populated) ..... **\$219**

## Herculean rebate!

The Hercules monochrome graphics card has saved hundreds of thousands of PC owners from terminal myopia, by supplying crisp clean monochrome graphics. The Hercules color card is the industry standard for color graphics. Both come with a parallel printer port, and a full two year warranty. And from May 1 through August 31, Hercules is offering a \$50 rebate on either card.

**Hercules Monochrome Graphics Card** ..... **\$299**  
(and get \$50 rebate from Hercules)  
**Hercules Color Card (1/2 slot)** .... **\$159**  
(and get \$50 rebate from Hercules)

## Disks

(10 per box)

<b>IBM-PC disks Verbatim DataLife (DS/DD)</b> (limited time offer! 12 disks for the price of 10) .....	<b>\$17</b>
<b>IBM-AT disks (DS-TPI)</b>	
Verbatim DataLife .....	\$34
Maxell .....	\$34
Fuji .....	\$27
(Floppies 514" Head Cleaner) .....	\$18

## Tip Sheet



**Name:** Jennifer Aiken  
**Title:** Sales Representative  
**Claim to fame:** Has eaten several pints of Ben & Jerry's White Russian ice cream at a single sitting.

"What do you mean your PC's too slow? Manual typewriters are slow. Doing spreadsheets by hand—that's slow. Admit it. When you first got your PC you thought it was the fastest thing you'd seen since high school. Ah, but the bloom is off the rose, as it were. And now you can't bear wasting those precious milliseconds. When you start a search, or a merge and purge, or a spreadsheet revision you want the thing done faster than you can say 'Gimme!'"

Well, o'kay. We understand. We can help. You need a processor with a faster clock speed. You're probably limping along at the PC's (or XT's) 4.77 MHz or the AT's 6 MHz. Whereas virtually every program on the market is ready to rip through RAM at 8 MHz or faster. Hey, speed kills, but it sure saves time. Go for it. Get fast. Get megafast. Give us a call and ask us about Orchid Technology's line of Turbo Boards. Don't wait!"

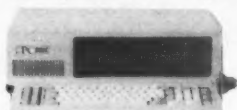
# PC CONNECTION



# When you want to talk computers. When you want to talk price.

**PC100**

## IBM Compatible Computer



- 20 MB Hard Disk
- 1 Floppy Drive
- 256K RAM
- 8 Expansion Slots
- 150 Watt Power Supply

**\$999<sup>00</sup>**

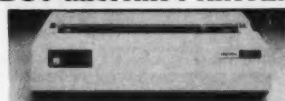
## NEC 1401 MultiSync "The Intelligent Monitor" with the Paradise Autoswitch EGA Card

"Best Value  
Bundle"



Both for **\$899<sup>00</sup>**

## OKIDATA 93 "Special Purchase" DOT MATRIX PRINTER



- 160 cps, 40 cps correspondence quality
- Parallel Interface
- IBM Plug'n Play or standard versions
- 136 column
- Tractor and friction feed

No. OK931, IBM  
No. OK93, standard

**\$299<sup>00</sup>**

## SEAGATE ST225 HARD DRIVE with controller

- 20 MB Disk
- Western Digital Controller

No. IB20

**\$469<sup>00</sup>**

## MOUNTAIN 20 MB Drive Card



- Self contained 3 1/2" Hard Disk Drive
- Single Plug In Card

No. MB20

**\$699<sup>00</sup>**

## AST Six Pak Plus with 384K RAM



- 384 K RAM Installed
- Clock, Serial, Parallel
- RAM Disk

No. ATS2

**\$229<sup>00</sup>**

## EPSON FX286 PRINTER

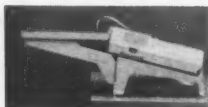


- Epson standard code
- 200 cps draft
- 40 cps NLO
- Parallel Interface

No. EPF286

**\$549<sup>00</sup>**

## CURTIS Universal Printer Stand



No. CUUPS1

**\$14<sup>99</sup>**

## HEWLETT PACKARD Laser Jet Plus 2686A



- 8 Pages Per Minute
- True Letter Quality Print
- Raster Graphics Capability
- Parallel/Serial Interface

No. HQ2686A

**\$2999<sup>00</sup>**

## IDEAssociates 5251 Emulation Card



- Local (Twinax) communications
- PC's to IBM System 34/36/38

No. IE5251..

**\$549<sup>00</sup>**

## ASHTON-TATE D-Base III Plus



This latest version offers all the data base management of D-Base II plus a built-in local area networking for the future.

No. ICAH03

**\$429<sup>00</sup>**

## Zenith Z158 Computer



- 256K RAM
- Desktop Design
- Dual Floppies
- RGB Video Card

No. ZE1582

**\$1499<sup>00</sup>**

## HAYES 1200 MODEM



- External 300/1200 Baud
- Power Pack Included
- Standard RS232

No. HY1200

**\$389<sup>00</sup>**

## LOTUS 1-2-3

A Spreadsheet data base management and graphics are combined in 1-2-3. The spreadsheet handles up to 256 columns and 8192 rows and provides more than 50 mathematical, financial, and statistical functions. Graphs include scatter plots, pie charts, and bar and line graphs. You can print master lists and mailing labels from information in the data base. Supports 8087 and 80287 Math Coprocessors.

Version 2.0 **\$319<sup>00</sup>**

No. ICLO01

## INTEL ABOVE BOARD

- Supports Lotus/Intel expanded memory specs
- Print Buffer
- RAM Disk Software

64K - PC  
No. IN1010

**\$239<sup>00</sup>**

128K - AT  
No. IN2010

**\$379<sup>00</sup>**

# COMPUTER MAIL ORDER

**CALL TOLL-FREE 1-800-233-8950**

477 East Third Street, Dept. C107, Williamsport, PA 17701

**Educational Institutions Call Toll-Free 1-800-221-4283**



**POLICY:** Add 3% (Minimum \$7.00) shipping and handling. Larger shipments may require additional charges. Personal and company checks require 3 weeks to clear. For faster delivery use your credit card or send cashier's check or bank money order. Pennsylvania residents add 6% sales tax. All prices are subject to change and all items are subject to availability. Defective software will be replaced with the same item only. Hardware will be repaired or replaced at our discretion within the terms and limits of the manufacturer's warranty. We cannot guarantee compatibility. All sales are final and returned shipments are subject to a restocking fee.

**1-800-268-3974**  
Ontario/Quebec

**1-800-268-4559**  
Other Provinces

## CANADIAN ORDERS

All prices shown are for U.S.A. orders.  
Call the Canadian Office for Can. prices.

**1-416-828-0866**  
In Toronto

**Telex: 06-218960**  
2505 Durwin Drive,  
Mississauga, Ontario  
Canada L5L1T1



## MICRO DIRECT SHOPPER

## DISKETTE TO DISKETTE CONVERSION

Over 500 Formats Available Including Typesetter Formats

- APPLE
- CPT
- XEROX 860
- IBM OS/2
- IBM DISPLAY WRITER
- SYSTEM 3, 34, 32, 36, 38
- WANG/OIS
- CP/M & UNIX
- MS-DOS
- MULTIMATE WORDSTAR
- ALSO 9 TRACK MAG-TAPE

LOW PRICES - CALL

## CONVERTTYPE COMPUTERS

In Calif. (800) 872-3470 Ext. 804

(800) 538-8157 Ext. 804

## MICRO DIRECT SHOPPER

Direct marketers of micro/PC products now have the opportunity they need to sell into large and mid-sized firms that buy and use micro/PC products by the thousands. Reach them directly through the pages of Computerworld's MICRO DIRECT SHOPPER display classified section. Advertisers must offer to sell their products and services by mail or phone orders only.

## If You Want To Get To The Fortune 2000, You Have To Be Here...

If you want to reach the big micro buyers advertise in what they read and rely on - Computerworld. These MIDP executives turn to our publication to find out what's going on in their world. The computer world. And you have to be here.

When you're considering using Computerworld's MICRO DIRECT SHOPPER display classified advertising section, consider this:

- 74% of all Computerworld readers at user organizations say their organization uses microcomputers.
- 67.4% of all Computerworld readers at user organizations say their organization plans to purchase micros and related products.
- 83.8% of these readers at user organizations are personally involved in these purchases.
- 51.1% of subscribers at vendor organizations say that their organizations are purchasing microcomputers in multiple units.
- 69% of subscribers and vendor organizations say they are personally involved in these purchases.

\* Source: A Profile of Computerworld Readers and Their Organizations, STAT Resources, August 1984.

For more information on Computerworld's MICRO DIRECT SHOPPER display classified advertising section, please call.

Computerworld  
(617) 879-0700  
800-343-6474

## MICRO DIRECT SHOPPER

## BAR CODE READER



- IBM PC/XT COMPATIBLE (AND MOST CLONES)
- CONNECTS BETWEEN KEYBOARD AND THE PC
- NO CARD SLOT REQUIRED (SIMPLE INTERCONNECT)
- NO CUSTOM SOFTWARE DRIVERS REQUIRED
- HIGH FIRST READ RATE
- READS DOT MATRIX & PRINTED BAR CODE LABELS
- CODE 3 OF 9, INTERLEAVED 2 OF 5, UPC
- AUTOMATIC BAR CODE SELECTION
- AUDIO AND VISUAL INDICATORS
- READS HIGH, MED. AND LOW DENSITY LABELS
- SWITCH SELECTABLE OPTIONS
- SELF-TEST DIAGNOSTICS

\$495

PC/MS DOS BAR CODE PRINTING SOFTWARE \$79

AMERICAN MICROSYSTEMS  
P.O. BOX 89081, RICHMOND, VA 21889  
(817) 834-9859  
MASTERCARD AND VISA ACCEPTED

## DATA ENTRY SYSTEM FOR PC'S

RODE/PC is the top-rated PC data entry software. Fastest and easiest to use. Extensive features to meet every data entry requirement. Stand-alone and LAN versions. High-speed data entry keyboard available.

DPX, Inc.  
20823 Stevens Creek Blvd.  
Cupertino, CA 95014  
(408) 973-9292

## CHANGING WORD PROCESSORS?

Replacing your dedicated word processors with PCs? Then you've encountered the problems of document conversion. It's not like data conversion, is it? For help in converting documents call us at: 213/421-3055



CAMSON  
A file conversion company

## MICRO DIRECT SHOPPER

## NCC

- Lifetime Warranty
  - U.S. Manufacturer
  - 100% Certified
  - Includes Tyvek Sleeve
  - Reinforced Hub
  - Write Protects
  - Includes Labels
- 408 496-1022  
1 (800) 245-3111

DS/DD 55¢  
Quantities of 100 or more



We also carry  
8" diskettes  
and AT Media

Call for prices on other 5.25" and 3.5" boxed and bulk diskettes. Dealer inquiries welcome.

SAME DAY SHIPPING

Larger Quantities Mean Lower Prices! Duplicating Services Available

National Computer Consulting Inc. • 3375 Scott Blvd. Suite 422 • Santa Clara, CA 95054

## PG SOURCE

Volume Supplier  
To  
Corporate Buyers...  
1-800-624-4031  
In Texas Call: 512-331-6700  
12303-G Technology Austin, TX 78727

## 9600 BAUD

Dial-Up  
Error-Correcting  
MODEMS  
\$995  
CALL (703) 820-3900 TO  
ORDER YOUR UPTA 96 MODEM  
ADD \$12.50 SHIPPING & HANDLING PER MODEM. ALL  
ORDERS COD. PREPAID ON CREDIT CARD.  
• EVI/Fastcomm Data Corp. •  
RESTON • VIRGINIA

## TAPE/DISK CONVERSION SERVICES

Conversion services to or from over 500 computer systems:

- Magtapes
- Micro Computers
- Mini Computers
- Word Processors
- Typesetters

Piver Computing Services, Inc.  
165 Arlington Heights Rd.  
Buffalo Grove, IL 60089  
(312) 468-0010

## PC LOCKS

SAM III  
MODEL 720 B  
for IBM PC's  
\$37.50  
Other Models from 21st Group Keying Available.  
SAM SYSTEMS INC. • (714) 844-2327  
P.O. BOX 2339 HAMMOND, IN 46323

## DATA ENTRY EMULATOR

For The IBM System 34/36 or The IBM PC/XT/AT  
Full speed head-down data entry with two-pass verification. Easy screen formatting by your data entry operators in minutes. Loaded with features like Auto dup & skip, verify by-pass, constant fields, range checks, table lookup, full screen paging, & field totals. Fully menu driven. Call for free 30 day trial period.  
\$395 (IBM-PC's) \$795 (System 34/36)  
COMPUTER  
EYES  
21929 Makah Rd  
Woodway, WA  
98020  
(206) 778-8443

## OPT-TECH SORT

High performance Sort/Merge utility with record selection and record reformatting. CALL as a subroutine or use stand-alone. Supports most languages and file types including Btrieve and dBase. Many features! \$149.  
Write or call for more information.  
Opt-Tech Data Processing  
P.O. Box 678, Zephyr Cove,  
NV 89448 (702) 588-3737

## BUY - SELL - SWAP

## SALE

STRATUS  
NEW XA600

Complete System

40% OFF LIST

Immediate Delivery

Mr. Paulin  
P.O. Box 517  
Paoli, PA 19301  
(215) 648-2418

THE COMPUTER  
LEASING  
HOT LINE:

800-243-5307

(In CT. call 203-661-4200)

You don't have to wait. Call us now for the best rates going on IBM systems... from 4381's to 3090's and everything in between. Ask for Thomas McShane.

Randolph



Randolph Computer Corporation



Subsidiary of Bank of Boston • 537 Steamboat Road, Greenwich, CT 06830

## Here's Everything You Always Wanted From Data General. But Couldn't Get.

We buy, sell and swap Data General gear of all kinds—processors, peripherals, storage, communications, etc.

But we're also authorized distributors for higher-performance DG-compatible equipment like Spectralogic controllers and C. Itoh and NEC printers, as well as for CDC, Fujitsu, Zetaco, MICOM, FACIT, Data Products and Kennedy.

We've got field service at a fraction of DG's prices. And depot service with immediate replacement of defective parts. As well as custom software on request.



Call or write Hanson Data Systems  
60 Brigham St., Marlboro, MA 01752  
(617) 481-3901  
Outside Mass. (800) 225-9215

HANSON  
DATA SYSTEMS, INC.

Data General's Only Single-Source Second Source.



BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

# "WAREHOUSE MOVING SALE"

## USED EQUIPMENT

Model	Qty.	Price
Anderson-Jacobsen		
AJ1234	5	100.00
AJ1235	9	265.00
AJ1245	2	85.00
AJ1255	5	150.00
AJ1258	2	125.00
AJ1259	20	170.00
AJ242A	7	35.00
AJ242/36	8	10.00
AJ243	10	35.00

## DIABLO

DBL 1640	1	450.00
DBL 1650	3	470.00
DEC LA12A	48	600.00
DEC LA12AB	3	900.00
DEC LA12C	1	600.00
DEC LA34AA	23	200.00
DEC LA36	7	125.00
DEC VT131-AA	5	600.00

## LEAR-SIEGLER

LSI ADM-31	1	362.00
LSI ADM-32	1	200.00
LSI ADM-36	2	225.00
LSI ADM-3A	2	175.00
LSI ADM-5	1	200.00

## USED EQUIPMENT

Model	Qty.	Price
TELEVIDEO		
TEL 914	1	300.00
TEL 950	4	325.00
TEL 970	10	425.00
TEL PTM	2	500.00
TEL 802	1	900.00
TEL 803	1	800.00

## TEXAS INSTRUMENTS

TI 745	10	225.00
TI 765	7	50.00
TI 785	10	480.00

## RACAL VADIC

VAD 103MA	3	35.00
VAD 103MB	17	35.00
VAD 212A	10	250.00
VAD 212LC	5	185.00
VAD 3413	5	170.00
VAD 3451	15	100.00
VAD 3451A	4	400.00
VAD 3455	3	230.00
VAD 355	2	50.00
VAD 71A	5	10.00
VAD 71B	3	10.00

## MISCELLANEOUS

GE 2120KSR	2	325.00
PEN 300/1200	1	130.00
TTY 43	10	175.00

## NEW EQUIPMENT

C. Itoh 220A	695.00
C. Itoh 220G	695.00
C. Itoh 220W	695.00
Codex 48150	218.00
Codex 48250	247.00
CTI-Data 4000-8	2,800.00
CTI-Data 4000-16	3,737.00
Epson LQ-1500	995.00
Lear Siegler ADM-11	325.00
Lear Siegler ADM-21	530.00
Micom 3012 PL	357.00
Televideo 803N	195.00
Televideo 914	375.00
Televideo 925	495.00
Televideo 925E	477.00
Televideo 970	695.00
Televideo TS1603	1,800.00
Televideo TS803	1,500.00
Televideo TS802H	3,600.00

Quantities Limited  
(Prices Subject to Change)

Ask for Dan Shaffer  
260 West Ave.  
Stamford, CT 06902  
call: 800-243-9006/7  
in CT 203-357-0004

**NATIONAL**  
COMPUTER

## IBM SYSTEMS, PERIPHERALS, UPGRADES

**SYSTEM 36  
SERIES/1  
SYSTEM 38  
SYSTEM 34  
PC, XT, AT  
4300/3080  
DISPLAYWRITERS  
DATAMASTERS S/23**

BUY, SELL, LEASE 612/894-2200 BUY, SELL, LEASE  
ALSO: FINANCE & OPERATING LEASES FOR ALL SYSTEMS & PERIPHERALS.

**Valley Computer  
& Financial, Inc.**

12205 Nicollet Avenue, Burnsville, MN 55337

## LEAS-PAK INTERNATIONAL

**BEST PRICE  
BEST SERVICE  
BEST DELIVERY**

WHETHER YOU BUY, SELL, OR LEASE

PRINTERS  
AND  
CRT'S

S/34  
AND  
S/38

SYSTEM 36 PROCESSORS  
AND  
DISK UPGRADES

LARGE  
INVENTORY

LEASE  
FINANCING

LEAS-PAK SOFTWARE SERVICES

ONE SOURCE SOLUTION

P.O. Box 759, Hurst, TX 76053 In Texas call 817/268-0023

1/800/LEAS-PAK

## IBM BUY · SELL · LEASE

**36  
38  
4300**

**SERIES 1**

Processors  
Peripherals  
Upgrades

**IBM**

(714) 847-8486

## IBM SPECIALISTS

SELL · LEASE · BUY

S/34 S/36 S/38  
3741 3742

- New and Used
- All Peripherals
- Upgrades and Features
- IBM Maintenance Guaranteed
- Immediate Delivery
- Completely Refurbished

800-251-2670

IN TENNESSEE (615) 474-0011



P.O. BOX 71 • 610 BRYAN STREET • OLD HICKORY, TENNESSEE 37138

Data General Users  
IN NEW YORK, NEW JERSEY AND CONNECTICUT



**DISASTER  
RECOVERY  
FACILITIES**

**Facility Management Plans**

FULLY MAINTAINED MV10000 AND MV6000 SYSTEMS,  
COMMUNICATION NETWORKS TO ACCOMMODATE  
HUNDREDS OF USERS, EXPANDABLE SYSTEM CAPABILITIES,  
EXCLUSIVE OR SHARED EQUIPMENT USAGE RIGHTS.

**NPA** Systems Inc.  
SALE, LEASE  
AND SERVICE OF

**Data General Equipment**

EAST COAST (516) 467-2500

NEW YORK: 781 Cones Avenue, Holbrook, NY 11741, 516-467-2500 Telex #510-222-0882  
CALIFORNIA: 2322 Fifth Street, Berkeley, CA 94710, 415-848-9835

## IBM 3420

**TAPE SALE!**

IMMEDIATE AVAILABILITY  
ON ALL MODELS

**SPECIAL SALE/  
LEASE RATES**

CALL PETER BLACK  
(313) 254-2850

## For Sale or Lease

3830-2 CONTROLLERS  
3350 DISK DRIVES  
3274-031 CONTROLLERS  
3278-2 DISPLAYS  
8K0731 KB  
3278-12 CONTROLLERS

For 24 Month Sub-Lease  
3861-024x16 Processor

## WANT TO BUY

IBM 3000 LASER PRINTER  
Contact Barbara  
(313) 254-2850

DEC -DG  
SALE LEASE

VAX-POP-11  
DISK TAPE  
TERMINALS

JULY OFF LEASE  
DEC 11/785 - XA-AE  
DG MV6000-2  
MV4000

AUGUST OFF LEASE  
DG MV10000

Call Bill Miller  
(313) 254-2850

"100 BILLION BYTES  
FOR 80% LESS"

Compare...	IBM 3850	IBM 3380E
TYPICAL DISCOUNT	80%	20%
SOURCE	VARGO	IBM
INCLUDES CONTROLLERS	YES	YES
PRICE	\$300,000	\$1,700,000
TYPICAL LEASE 2 YR. WITH MAINT.	\$20,000	\$95,000

Call Mike Vargo (313) 254-2850  
3000 AVAILABLE NOW

**Vargo**

48945 Van Dyke, Utica, MI 48007  
(313) 254-2850

Want To Buy  
Or Sublease

## 3380 Disks

All Models

Call Ext. 401  
(800) 821-0229  
(818) 986-2411



El Camino Resources



BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

BUY SELL SWAP

Providing  
the **BEST**  
a **BETTER**  
WAY.



# BUY·SELL·LEASE S/34·S/36·S/38 43XX·30XX SERIES/1 NEW OR USED

## WE OFFER...

- PLUG COMPATIBLES • OEM
- COMMUNICATIONS EQUIPMENT
- AT&T • BURROUGHS\*
- XEROX\* PLUS...

## COMPLETE FINANCIAL SERVICES

- ECONOCOM CONTINGENCY SERVICES (REASER)
- RECOVERY PLANNING AND RECOVERY CHARGES FOR S/34-S/38

- THE ECONOCOM LINE OF PLUG COMPATIBLES
- SERVICE PLUS FROM ECONOCOM MAINTENANCE CONTRACT
- PROFESSIONAL SERVICE
- COMPETITIVE PRICING
- FLEXIBLE FINANCING
- QUICK DELIVERY
- SURETY TITEL LEASING
- LONG TERM LEASING
- PERIPHERAL LEASING
- TRAINING ACCEPTED
- TAKE-OUT HOME
- MAINTENANCE GUARANTEE



SEND US YOUR BUSINESS CARD AND WE'LL SEND YOU A COPY OF OUR CAPABILITIES BROCHURE, COMPUTER MARKET ADVISOR, SERVICE PLUS BROCHURE AND ECONOCOM CONTINGENCY SERVICES PACKET.

**ATLANTA** (404) 399-6732  
**BIRMINGHAM** (205) 823-4566  
**BOSTON** (617) 449-1958  
**CHARLOTTE** (704) 523-5588  
**CHATTANOOGA** (415) 626-0976  
**DALLAS** (214) 751-4980  
**DENVER** (303) 993-1511  
**HOUSTON** (713) 789-0880  
**KANSAS CITY** (816) 238-3098  
**LITTLE ROCK** (501) 224-6162  
**LOS ANGELES** (714) 852-8831  
**LOUISVILLE** (502) 589-3276  
**MEMPHIS** (901) 767-9130  
**MIAMI** (305) 735-4999  
**NASHVILLE** (615) 386-7819  
**ORLANDO** (305) 767-9416  
**BALTIMORE** (410) 544-6385  
**TELLE** (918) 993-5815

IN ADDITION, THE ECONOCOM CORPORATION HAS 31 OFFICES THROUGHOUT EUROPE.

## ECONOCOM-USA, INC.

845 CROSSOVER LANE • MEMPHIS, TN 38117

800-238-3098  
OR 901-767-9130

## LEASING...

Fully Equipped and Operational

## DATA CENTER

- IBM 3083 • EX Processor
- MVS Operating System

OFFICE SPACE AVAILABLE

For Further Information  
Call: (203) 529-4753

Who do you call on first for your data processing and telecommunications needs?

## CMI SPECIALISTS

**3081, 3083  
3084**  
FOR SALE  
OR LEASE

## 3480 TAPE DRIVES FOR LEASE OR SALE

	3480-A22	3480-B22
12 Mo. Rate	\$ 2,170	\$ 1,430
24 Mo. Rate	\$ 1,498	\$ 985
36 Mo. Rate	\$ 1,215	\$ 800
SALE	\$55,615	\$36,655

Any Configuration Available. Call for Details.  
Kevin Shaefer (313) 857-3850

Encino, CA (818) 789-0113  
Laguna Hills, CA (714) 951-3200  
Sacramento, CA (916) 443-7511  
Miami, FL (305) 442-2968  
Tampa, FL (813) 228-7000  
Atlanta, GA (404) 256-7942  
Chicago, IL (312) 620-4400  
Boston, MA (617) 367-5755

Absecon, NJ (609) 645-7282  
Flemington, NJ (201) 782-3878  
Oceanport, NJ (201) 542-6776  
Cleveland, OH (216) 292-8142  
Lebanon, TN (615) 449-6633  
Dallas, TX (214) 869-3111  
Houston, TX (713) 780-7459

Vancouver, British Columbia (604) 685-6196  
Toronto, Ontario (416) 928-3400  
Montreal, Quebec (514) 871-1121  
Nyon, Switzerland Telex: 27209  
Paris, France Telex: 214093  
Frankfurt, West Germany Telex: 4170499  
London, England Telex: 848980

## CMI

## CMI Corporation

CMI Financial Services Group  
2600 Telegraph Rd./P.O. Box 2026,  
Bloomfield Hills, MI 48303-2026  
(313) 456-0000/TWX 810-232-1667 CMI CORP. BDHS

Member ASCD and CDLA

## How

HOW DO YOU KNOW YOU'RE GETTING THE BEST DEAL?  
HOW DO YOU GET A QUICK PRICE QUOTATION?  
HOW DO YOU GET FAST DELIVERY?  
HOW DO YOU KNOW YOUR EQUIPMENT IS GUARANTEED?  
HOW DO YOU KNOW WHAT TO BUY?  
HOW DO YOU KNOW WHOM YOU'RE DEALING WITH?  
HOW DO YOU KNOW YOU WILL BE SATISFIED?

## CALL US...

WE'LL TELL YOU HOW

WE BUY • SELL • LEASE  
34 • 36 • 38 • SERIES 1 • 4331-4381  
ALL PERIPHERAL EQUIPMENT  
ALL UPGRADES  
SOFTWARE & DATA COMMUNICATIONS CONSULTING

CALL: 800-238-6405  
IN TN: 901-372-2622  
IN NC: 919-884-0879



COMPUTER BROKERS INC.

2978 SHELBY ST.  
MEMPHIS, TN 38134

"SINCE 1974"



## BUY DIRECT

## \*the computer marketplace

SYSTEMS / 34 • 36 • 38

BUY, SELL & LEASE

COMPLETE IBM SYSTEMS

CPU'S • CRT'S • PRINTERS • UPGRADES  
FEATURES & PARTS, ALL MODELS, NEW & USED

Discount Prices • Express Service  
IBM Maintenance Guaranteed

A TRULY NATIONAL MARKET PLACE  
WHERE ONE TOLL FREE CALL DOES IT ALL!

800-858-1144

\*Division of QUALITY ASSOCIATES, INC. • IN CA (714) 630-2965

3704

3705 3725  
BUY • SELL • LEASE

Call Toll-Free  
800 532-7532

In Minnesota Call 612/944 9161

Centron DPL Company  
Member COLA

Sell IBM  
S/1 **34**  
38 UPGRADES  
Lowest Prices

404-475-7507  
**36**  
DATAMARC  
785 Branch Drive  
Alpharetta, GA 30201  
We Pay Highest  
Prices For S/34's

Sale Or Lease

3081 K32x24  
3083 J24x16

CA/EN 401  
(800) 821-0229  
(818) 986-2411  
In California  
El Camino Resources

Unilease already has  
a second-user 3090.  
Of course.

**UNILEASE**

(212) 296-1040 New York Orlando Los Angeles London Düsseldorf Paris



## BUY SELL SWAP

## BUY SELL SWAP

## BUY SELL SWAP

## BUY SELL SWAP

## BUY SELL SWAP

**8/34's**

Printers  
Modems  
Tapes  
CRT's

Upgrades  
• magazine  
• memory  
• disk  
• features

call  
**800-828-4227**  
in Va. (703) 642-1950

**CARLYN**  
COMPUTER SYSTEMS  
5105Q BACKLICK ROAD, ANNANDALE, VA 22003

3705-MB3 Avail/Aug  
3704-A2 Avail/July  
Conn. Controllers  
Sale Or Lease

**4381's**  
**4341's**  
Sale/Lease

Printers  
4245 4248 3203  
3800 3262 3287  
Immediate Delivery

Controllers  
3860 3274  
3803 3278  
Display Stations  
3278 3178  
3279 3179

DASD  
**3380 3375**  
**3370 3350**  
Immediate Delivery

TAPE DRIVES  
3420 3430  
3410 3480  
Immediate Delivery

We Buy, Sell & Lease IBM Processors and Peripheral Equipment



**Computer Marketing Inc.**

PO BOX 0, MARGATE, NJ 08402-0430

**609/823-6000**

Contact/Bernie Gest

Telex: 5106012295

**CDL**

Established 1969

**COMDISCO**

The #1 Independent Lessor

**Eastern Region**  
Connecticut\* ..... 203/866-1211  
Carlstadt, NJ ..... 201/896-9500  
Washington, DC ..... 301/441-1000  
Philadelphia, PA ..... 215/545-8025  
Boston, MA ..... 617/542-4005  
Red Bank, NJ ..... 201/842-5111  
Pittsburgh, PA ..... 412/279-4074

**Midwestern Region**  
Chicago\*\* ..... 312/898-3009  
Michigan ..... 313/644-1500

**Western Region**  
San Francisco\* ..... 415/944-1111  
Los Angeles ..... 213/436-7737  
Denver ..... 303/770-5555

**Canadian Region**  
Toronto\* ..... 416/868-7135  
Montreal ..... 514/354-2110  
Vancouver ..... 604/222-3323

\*Regional Headquarters  
\*\*Corporate Headquarters

Lease or Sale **3380AA4/3380B4/3880** Wanted to Buy

We Buy & Sell  
**DEC**  
Systems  
Components

Digital Computer Resale  
call: **713 445-0082**  
600 Kemmick Ste C22  
Houston, Tx 77060

IF YOU'RE BUYING, WE'RE SELLING.

36  
38  
4300

IF YOU'RE SELLING, WE'RE BUYING.

IBM SYSTEMS Buy • Sell • Lease PERIPHERALS  
(800) 331-8283  
TOLL FREE  
(213) 306-9343  
CALIFORNIA  
Ocean Computers, Inc.  
8055 W. Manchester Ave., Ste 525  
Playa Del Rey, CA 90293

Sale Or Lease  
**3890-B04**  
Loaded With Features

Call Ext 401  
(800) 821-0229  
(818) 986-2411  
In California  
El Camino Resources

**IBM**  
HARDWARE  
BUY • SELL • LEASE

SERIES-1  
S/34 • S/36 • S/38  
S/23 • 4300 • POS

**AMCOM**  
6200 W 73RD ST  
MINNEAPOLIS, MN 55435  
612-635-4737 800-328-7723

**4381-P14**  
AVAILABLE  
IMMEDIATELY  
SALE or LEASE  
Call Your  
IPS Account Manager  
Information Processing  
Systems, Inc.  
(201) 262-9500

Rentals Month To Month  
Terminals  
3193, 3178  
Terminal Controller  
3174  
Call For Rates  
Call Ext 401  
(800) 821-0229  
(818) 986-2411  
In California  
El Camino Resources

# The Bulletin Board

Buy • Sell • Lease

Buy • Sell • Lease

Buy • Sell • Lease

Buy • Sell • Lease

## DATA GENERAL

**NEW D.G. C.R.T.'s**  
D214 ..... 595, D411 ..... 985,  
D215 ..... 675, D461 ..... 1125.  
Lowest prices on all MW-2000s,  
DESKTOPS, MEMORY BOARDS  
& MULTIPLEXERS.  
**ALPHA-KENCO, INC.**  
1-800-44-KENCO  
New York State: 718-633-2800  
Formerly Kenaco Data Systems

## HONEYWELL

### HONEYWELL SPECIALISTS

#### LEVEL 6 DPS 6 SERIES 16

The Recognized Leader  
In Honeywell Minicomputer  
Sales And Support

- Complete Minicomputer Line - New and Used
- All Peripherals and Terminals
- Upgrades and Features
- Depot Repair Capability
- Honeywell Maintenance Guaranteed
- Immediate Delivery - Low Prices
- Complete Refurbishment
- Special Cable Requirements

617-393-6639  
TWX 710-347-7574  
**Boudreau Computer Services**  
Since 1974  
100 Bearfoot Rd.  
Norfolk, Massachusetts 01532

## HONEYWELL

### LEVEL 6 AND DPS6 USERS NEW AND RENEWED ORIGINAL

Systems - Peripherals - CRT's  
Memory - Controllers - Cables  
Guaranteed Honeywell Maintenance

Large software staff  
C.D. Systems Inc.  
1-800-351-2310

## IBM

### SERIES/1 BUY - SELL - LEASE

New, Used, CDC, Features

**Kerxes Computer Sales**  
800/328-3884 612/936-8299

**34-36-38**  
Systems,  
Peripherals & Upgrades  
Guaranteed Quality Service  
Special Reduced Prices  
New and Used Equipment  
**Carlyn Computer Systems, Inc.**  
800-828-4227  
In Va (703) 642-1950

## IBM

Want To Buy  
**System 38 & 36**  
Call Terry Lyne  
(312) 371-8485

**IBM**  
**3178, 3179,  
3278, 3274**  
All Other IBM Units Available  
Call Penny 800/426-4341  
In CA 408/241-3677  
**Marketex Computer Corp.**

### S/38 S/36 S/34 SERIES 1

BUY - SELL - LEASE  
Systems, Peripherals & Upgrades

**Source Data Products**  
800/328-2669 415/328-7333

SALE/LEASE  
**S/38**  
Model 18  
Customer Support Included  
Call Ron Gibb (914) 238-9631  
Computer Merchants Inc.

## IBM

SALE/LEASE  
**IBM 7171**  
ASCII CONVERTOR  
32 Ports  
Available Now  
Call Bill Hegan  
Computer Merchants Inc.  
(914) 238-9631

**S/38**  
Mod 5, Mod 8, Mod 18  
Immediate Availability  
Must Sell Or Lease  
**Source Data Products**  
800/328-2669 415/328-7333  
Call Bob Losky

### SALE/LEASE NEW 3179-2 5291-200

Discount Prices  
Immediate Delivery

Call Ron Gibb (914) 238-9631  
Computer Merchants Inc.

For Sale By Owner  
**IBM Compatible**  
3 Remote Controllers, 40 Terminals (Standard Keyboard), 1 Printer  
Ready To Ship  
(212) 685-7300 xtn 241

## IBM

WILL PAY TOP \$  
**IBM 36, 38, 34**  
and Peripherals  
Call Greg Morgan  
800/426-4341  
In Calif. 408-241-3677  
**Marketex Computer Corp.**

**Fox Computer Sales**  
Buy • Sell • Rent • Lease  
**DATAPoint**  
W.T.B.: Used Equipment  
(216) 449-5205

## NCR

**658 DISK UNITS**  
NCR Mainframe Avail. Immed.  
**Harwood International Corp.**  
100 Northshore Office Park  
Chattanooga, TN 37343  
Tel. (615) 770-5500 Telex #3785891  
We supply more NCR Computer Equip.  
To More NCR Users  
Than Any Other Company.  
Except NCR!!

## HEWLETT PACKARD

**HP3000**  
BUY • SELL • RENT • LEASE  
Processors • Peripherals • Systems  
**ADCC Special**  
ADCC (4 Ports) For S/4X  
\$800  
With Purchase Of  
2 Or More Terminals  
Immediate Delivery  
Subject to Availability  
Guaranteed to Qualify  
for HP Maintenance  
**ConAm Corporation**  
(800) 643-4954 (213) 829-2277

### HP 3000 • 1000

9000 and now 250  
Buy & Sell Worldwide  
**ENCORE**  
(213) 452-9117  
Telex 756927

FOR SUB-LEASE to 6/30/88  
**HP 3000/48 SYSTEM**  
w/2 Disk Drives, Tape Drive,  
300 LPM Printer, ASYNC Controller  
And ATP Board. Includes 3 CRT's And  
4 P.C.'s. One Laser Jet Printer  
Union Carbide Corporation,  
38 Old Ridgeway Road, Danbury, CT  
06817-0001; (203) 794-2900



## The Bulletin Board

## MISC.

## FOR SALE

(2) Eastman Kodak  
Oracle Microfilms 16mm  
Accommodates 215-foot rolls of  
thin based film. Reduces up to  
11 by 14" in size

Call Rick at IDG  
(617) 875-5000 (ext 452)

## MISC.

## NEW &amp; USED

## RAISED FLOORING

Immediate Delivery  
Quality Installation

## RAISED COMPUTER FLOORS

One Charles Street  
Westwood, NJ 07675  
(201) 666-8200  
Telex #13-5076

## MISC.

## Disk Packs

CDC 9883-91 \$195.  
CDC 883-91 \$175.  
CDC 877 \$125.  
CDC 876 \$75.

Digital Computer Resale  
(713) 445-0082

## WANG

### THE RIGHT EQUIPMENT RIGHT NOW AT THE RIGHT PRICE ICA..THE RIGHT CHOICE

founded 1981 by ex-Wang employees  
(404)877-4388 or (800)241-3159

**BUY - SELL**  
MVP/LVP • OIS • VS • PC  
SYSTEMS IN INVENTORY  
VS-45 • OIS • VS-100  
GENESIS  
EQUIPMENT MARKETING  
GEM  
(802) 277-8230

## PRIME

TSI - the oldest, largest and most ex-  
perienced supplier of third party per-  
ipherals, memories and controllers for  
Prime users.

**BUY • SELL • LEASE • RENT**  
800-222-DISK  
NATIONAL 800-421-4135  
Florida  
Timesharing Services, Inc. 4080  
Woodcock Dr., Jacksonville, FL 32207

LARGE SELECTION OF USED  
PRIME COMPUTER SYSTEMS  
...SAVINGS TO 50%  
Peripherals also available  
1st SOLUTIONS, INC.  
2001 EAST CAMPBELL AVE.  
PHOENIX, ARIZONA 85016  
(602) 957-0999  
ASK FOR DON OR MATT

Your Ad  
Could Be Here  
For  
\$160.00

## The Bulletin Board

## DEC

11730/R80/RL02/DMF32 \$8,500  
Micro VAX (VRS050R052) Call  
Micro 1173 System  
Unused \$9,800  
LN01-AB Unused \$7,900  
LN01-AC Used \$4,500  
ROC25-AA Complete \$2,500  
RUC25-AA Complete \$2,500  
RP07-Spare Call  
RAB0-AA Unused \$5,500  
FP730-AA \$2,990  
FP730-AA \$750  
RM05-FA Unused \$3,900  
RM05-AA Unused \$3,800  
TUT8-AB-2400 Hours \$18,900  
MS780-FD-1 Meg \$750

We Pay Cash For Your  
Used/New DEC Equipment  
Continental Computers  
(213) 838-2284

### DEC SUMMER SIZZLERS

11/44 CPU Set KD11Z...\$3,900  
HSCSX-CA...\$5,700  
KL785 WCS...\$3,700  
MF20-M...\$4,400  
MS330-BA...\$2,900  
MS330-BB...\$4,200  
MS750-CA...\$1,675  
MSV11-CC...\$3,500  
MS11-LD...\$375  
MSV11-PL...\$695  
VAX 730 CPU KIT...\$4,400  
VAX 730 CPU KIT...\$8,900  
VAX 4MB MS780-JD...\$5,900  
VAX 4MB MS86-BA...\$11,300  
Call Ray at CIE, Inc. (817) 275-9800

## DEC NEW &amp; USED

## BUY - SELL - EXCHANGE

Systems • Processors • Memory  
Options • Peripherals • Modules  
LAKEWOOD COMPUTER CORP.  
438 Link Lane  
FL Collins, CO 80524  
(303) 493-6408

DECMATE II \$1,695.  
LQP02 \$1,395.  
Digital  
Computer Resale  
(713) 445-0082

## DEC

## BUY • SELL • TRADE

Planning to buy non-DEC memory?  
Check our DEC memory prices first!

1124-DC FP11-F MSV11-JC  
BC20V-50 MS11-FB MSV11-JA  
BC20V-80 MS750-CA MSV11-JC  
DZ11-OP MS750-DC UDA50-A  
NEW YORK COMPUTER EXCHANGE  
(516)752-8666 (800)645-9109

### 11/23+ System For Sale

474 Mb Disk; 92181 1600 BPI  
Tape; 256 Kb MOS Memory; CIS,  
FPP, + EIS; DZV 4 Channel Mux  
Asking \$14K  
Call (305) 584-4590

## \*VAX USERS\*

Configured For You:  
11/750-FA LA120-DA RGM05-AA  
11/780-EA LP11-EA RUAB1-CA  
FP750 MS750-CA TGL077-AB  
FP780-AA MS780-FD TUB1-Equ.  
DIGITAL BASICS INC.  
3705 W. County Rd. 42  
Burnsville, MN 55337  
(612) 990-1196

## BURROUGHS

### BUY SELL LEASE BURROUGHS

B-20 to B-7900  
SPECIAL 207 DISK  
(10 Units)  
B900 DISK PACK (206 Style)  
Subsystem  
DEPOT  
MAINTENANCE  
Computer Provisions  
(216) 248-7878

# TIME & SERVICES

# SOFTWARE FOR SALE

## DATA CENTER SERVICES

• MILLENNIUM • NOMAD2  
• OS/MVS/SP • TSO/SPF  
• VM/370 • CICS  
• DOS/VSE/SCP • IMS/DBDC  
• CMS • RJE  
• TELENET ACCESS

Info Center Products  
Access By Micros  
EXCELLENT SERVICE LEVELS  
COMPETITIVE RATES  
VOLUME DISCOUNTS

### BURNS COMPUTING SERVICES, INC.

MIDWEST: EAST COAST:  
312/981-5280 215/390-3000  
212/432-1181

MILLENNIUM is a registered  
trademark of McCann & Dodge  
NOMAD2 is a trademark of  
D&B COMPUTING SERVICES, INC.

## GENIX-REMOTE COMPUTING SERVICES

### NO CONNECT TIME CHARGE

Highest  
Quality  
IBM  
Remote  
Computing  
at Best  
Possible  
Prices

• MVS SP1.3  
• VM • DOS  
• CICS • CMS  
• FCO • IMS DB/DC  
• ROSCOE  
• TSO ISPF • VSPC  
• MILLENNIUM  
• FOCUS, SAS  
• MICRO/MAIN-  
FRAME LINK  
• MANTIS  
• Capacity Planning  
• Complete Application  
Development Tools

We Are a  
Customer Service  
Oriented Company  
with Offices in:  
• Atlanta  
• Denver  
• Philadelphia  
• Pittsburgh  
• Washington, D.C.  
GENIX Corporation  
20 Stanwix Street  
Pittsburgh, PA 15222  
1-800-874-3649  
**GENIX**

## COMPUTER TIME RENTAL

IBM 4331  
DOS/VSE - ICCF  
All Shifts Available  
3370 Disk, 3420 Tape  
800/1600 Density  
1403-N1,  
2540 Reader/Punch  
Reasonable Rates  
Contact: Al Palmo  
Restamatic Data Services  
(212) 997-1439

## ICOTECH

Innovative Computer Techniques  
DATA PROCESSING SERVICES  
IBM 3081 DEC-10 VAX 8600

• Batch Processing  
• Time-sharing  
• Microfilm  
• Public Network Access  
• Laser Printing  
• Optical Mark Reading

Introducing...  
the ICOTECH  
Health & Safety  
Information System  
Route 292 • Raritan, N.J. 08869  
201-685-3400 • Contact: Joyce Bogenhan

## Rent Terminals or Time

in the Classified  
Pages of  
Computerworld.  
Call 800-343-6474  
(or 617-879-0700)  
for more information

## Award-Winning

Elegant  
Software  
for IBM  
S/36 & S/38  
Computers

### Featuring:

- Unsurpassed Documentation
- Large Scale Integration
- User-Defined Vocabulary
- Paperless Processing

General Accounting	Job Cost Accounting
Accounts Payable	Payroll/Personnel
Accounts Receivable	Inventory Management
Equipment & Fixed Assets	Order Processing
Financial Reporting	Sales Analysis
Planning & Budgeting	Oil & Gas Accounting

## J.D. Edwards & Company

4949 S. Syracuse / Suite 5500 New York — 201/348 8989  
Denver, CO 80237 Dallas — 214/ 458 0636  
303/ 773 3732 Houston — 713/ 880 8278  
San Francisco — 415/ 571 5755  
Newport Beach — 714/ 955 0118  
Tulsa — 918/ 493 1477

IBM  
Value  
Added  
Reseller



# "With Computerworld, we're assured of strong reach— both locally and nationally."



Mike Albert  
Vice President  
Austin Knight Advertising

**"A**nyone who thinks recruitment advertising means just placing an ad in Sunday's paper is way behind the times," explains Mike Albert, Vice President of Austin Knight Advertising, an international recruitment advertising agency.

He and his agency colleagues look for publications which have good reputations and editorial prominence in the marketplace. In the computer field, their choice is Computerworld.

*"Computerworld reaches just about everyone our clients need to reach," explains Mike. "Not just the individual who was fired on Friday. But potential candidates. Future customers. Talented users. Resellers. Manufacturers. Vertical markets."*

And Mike has found that Computerworld reaches more than just the person whose name appears on the issue. *"Computerworld is often routed within a department, and that means extra reach for our clients. Smart people read what the boss is reading. Computerworld gets the data processing geniuses and their staffs — and the advertisers get the free coattail effect,"* Mike continues. *"With its pass-along, Computerworld reaches the full gamut of the computer-professional audience."*

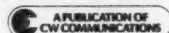
Computerworld gets better response — in quantity and quality — than many local and national newspapers, according to Mike. *"Computerworld creates an environment that lends credibility and reach. It carries color which beats the dull and boring Sunday classifieds. And that credibility and reach produce quantity and quality that you just won't get from many other newspapers or magazines. Without a doubt, Computerworld is the best in the business,"* he concluded.

Computerworld. We're helping employers and top professionals get together in the computer community. Every week. Just ask Mike.

For all the facts, call Al DeMille, National Sales Manager, at (617) 879-0700.

## COMPUTERWORLD

375 Cochituate Road, Box 9171,  
Framingham, MA 01701-9171/(617) 879-0700





# POSITION ANNOUNCEMENTS

## New, free Survey shows how salaries dramatically change according to your geographic location

The new **1986 Local Metropolitan Computer Salary Survey** is now available with absolutely no cost or obligation to you.

In it, you'll learn where salaries are on the rise, where they are falling, what skills are in most demand and which new areas of specialization you really should consider exploring. The Survey covers sixty-three position categories ranging from Programmer to Computing Systems Director in fifty-six different metropolitan areas across the U.S. and Canada.

So whether you are interested in learning what your peers are making all across North America—or you want to get an idea of what you can expect to earn as you move up through the ranks of the profession—our new Survey will give you the most timely, accurate and thorough information available to computer professionals. Simply call the Source Edp office nearest you, and we will mail a copy to you in complete confidence.

### Call the office nearest you.

To receive your free copy call the Source Edp office nearest you listed below.

#### United States:

**Alabama**  
Birmingham ..... 205/322-8745  
**Arizona**  
Phoenix ..... 602/279-1010  
Tucson ..... 602/792-0375  
**California**  
Northern  
Mountain View ..... 415/960-4910  
Sacramento ..... 916/446-3470  
San Francisco ..... 415/434-2410  
Walnut Creek ..... 415/945-1910  
Southern  
Fullerton ..... 714/739-1313  
Irvine ..... 714/833-1730  
Los Angeles  
Downtown ..... 213/688-0041  
South Bay ..... 310/540-7500  
West ..... 213/203-8111  
San Diego ..... 619/573-0100  
San Fernando Vly ..... 818/781-4800  
**Colorado**  
Colorado Springs ..... 303/632-1717  
Denver ..... 303/296-8228  
Englewood ..... 303/773-3700  
**Connecticut**  
Hartford ..... 203/797-0590  
New Haven ..... 203/522-6590  
Stamford ..... 203/787-4595  
Stratford ..... 203/375-7240  
Waterbury ..... 203/574-5833  
**Delaware**  
Wilmington ..... 302/652-0033

#### District of Columbia

Washington D.C. .... 202/293-9255

#### Florida

Fort Lauderdale ..... 305/371-0145  
Jacksonville ..... 904/356-1820  
Melbourne ..... 305/725-3085  
N. Miami Beach ..... 305/940-1014  
Orlando ..... 305/282-9455  
Tampa ..... 813/251-3215

#### Georgia

Atlanta/Downtown ..... 404/588-9350  
Atlanta/North ..... 404/953-0203  
Atlanta/Perimeter ..... 404/255-2045

#### Illinois

Chicago/E. Loop ..... 312/861-0770  
Chicago/W. Loop ..... 312/346-1280  
Oak Brook ..... 312/988-0422  
Peoria ..... 309/673-0274  
Rolling Meadows ..... 312/392-0244

#### Indiana

Fort Wayne ..... 219/432-7333  
Indianapolis ..... 317/631-2900

#### Iowa

Des Moines ..... 515/243-0191

#### Kansas

Overland Park ..... 913/888-8885  
Topeka ..... 913/232-5722  
Wichita ..... 316/688-1621

#### Kentucky

Louisville ..... 502/581-0900

#### Louisiana

Baton Rouge ..... 504/924-7183  
New Orleans ..... 504/561-8000  
Shreveport ..... 318/222-6188

#### Maryland

Baltimore ..... 301/727-4050

#### Massachusetts

Boston ..... 617/482-7613

#### Michigan

Detroit ..... 313/259-7807

#### Minnesota

Bloomington ..... 612/835-5100

#### Mississippi

Jackson ..... 601/354-7900

#### Missouri

Kansas City ..... 816/474-3393

#### Montana

Billings ..... 406/252-7410

#### Nebraska

Omaha ..... 402/348-0708

#### Nevada

Las Vegas ..... 702/388-7650

#### New Hampshire

Nashua ..... 603/888-7650

#### New Jersey

Atlantic City ..... 609/345-2444

#### New Mexico

Albuquerque ..... 505/247-4270

#### New York

Albany ..... 518/482-2035

#### New York City

Manhattan ..... 212/557-8811

#### North Carolina

Charlotte ..... 704/552-6577

#### North Dakota

Bismarck ..... 701/252-6188

#### Ohio

Cincinnati ..... 513/769-5080

#### Oklahoma

Oklahoma City ..... 405/252-7410

#### Oregon

Portland ..... 503/223-6180

#### Pennsylvania

Allentown ..... 610/776-0524

#### Rhode Island

Providence ..... 401/751-0085

#### South Carolina

Columbia ..... 803/256-7446

#### South Dakota

Spearhead ..... 605/271-7044

#### Tennessee

Chattanooga ..... 615/265-8890

#### Texas

Austin ..... 512/478-0720

#### Utah

Salt Lake City ..... 801/966-3900

#### Vermont

Montpelier ..... 802/255-8890

#### Virginia

Richmond ..... 804/222-1155

#### Washington

Seattle ..... 206/454-6400

#### Washington D.C.

Washington ..... 202/293-9255

#### West Virginia

Charleston ..... 606/252-6188

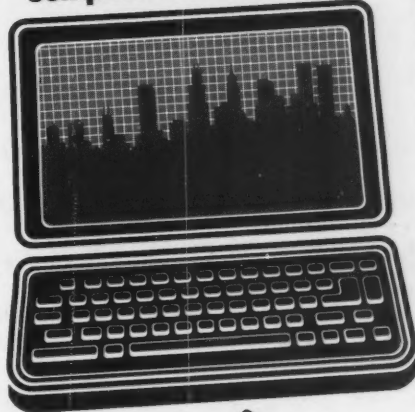
#### Wisconsin

Green Bay ..... 414/432-1184

#### Wyoming

Cheyenne ..... 307/252-6188

### 1986 Local Metropolitan Computer Salary Survey



source edp  
Personnel Services

**El Paso** ..... 915/532-6316  
**Fort Worth** ..... 817/338-9300  
**Houston** ..... 713/751-0100  
Downtown ..... 713/439-0550  
Galleria/Post Oak ..... 512/342-9898  
**Utah**  
Salt Lake City ..... 801/966-3900  
**Virginia**  
McLean ..... 703/790-5610  
**Washington**  
Seattle ..... 206/454-6400  
Spokane ..... 509/838-7677  
**Wisconsin**  
Green Bay ..... 414/432-1184  
Madison ..... 608/251-0104  
Milwaukee ..... 414/277-0345  
**Canada:**  
**Alberta**  
Calgary ..... 403/279-1940  
Edmonton ..... 403/458-1153  
**British Columbia**  
Vancouver ..... 604/222-1155  
**Manitoba**  
Winnipeg ..... 204/942-1151  
**Ontario**  
Mississauga ..... 416/648-3344  
Toronto ..... 416/591-1110  
Windsor ..... 416/495-1551

source edp  
Personnel Services

The world's largest recruiting firm devoted exclusively to the computer profession. Client companies assume our charges. Source Edp, Department 7016, P.O. Box 700, Mountain View, CA 94039. (When writing, please include your title.)



## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS



# Had-it-it's?

**HADITITIS** is an increasingly common condition among MIS/EDP professionals. Unmistakable symptoms include: chronic boredom due to lack of challenge; episodes of acute frustration brought on by low pay and overly long hours; and classic appreciation-deficiency anemia. If it's time for you to take the cure, consult EDP/Temps and CONTRACT SERVICES, the largest division of Technical Aid Corporation, one of the country's leading and best respected technical consulting companies. With 800 employees and 2000 clients, EDP/Temps and CONTRACT SERVICES has 16 years' experience finding you everything you want: short or long term contracts, job security, excellent pay (\$15-\$45/hr.), convenient locations, flexible schedules, and challenging assignments so you'll continuously be developing your skills and making yourself more marketable.

• Technical Analysts • Software Engineers • Data Base Consultants • Project Managers  
• Systems Analysts • Communication Analysts • Documentation Specialists  
• Programmers/Operators • Technical Writers

ADABAS  
BASIC  
BURROUGHS  
CICS  
CMS  
COBOL  
COPICS  
dBASE II

DBMS  
DMS  
DOS/VSE  
FOCUS  
FORTRAN  
GUARDIAN  
HOGAN  
HP  
IBM

IBM PC  
IDMS DB/DC  
IMAGE  
IMS DB/DC  
LAN  
MAPICS  
MARK IV, V  
MPE  
MVS

NCP  
NATURAL  
NOMAD  
OS  
PATHWAY  
PL/I  
RAMIS  
RPG II, III  
SDLC

SNA  
TAL  
TANDEM  
TPNS  
UNIVAC  
UNIX  
VAX  
VMS  
VTAM

**BALTIMORE**  
7133 Rutherford Rd.  
Baltimore, MD 21207  
(301) 265-6500

**BOSTON**  
15-19 Crawford St.  
Needham Heights, MA 02194  
(617) 449-6694  
One Center Plaza  
Boston, MA 02108  
(617) 723-6111

**CHICAGO**  
2115 Butterfield Rd.  
Oak Brook, IL 60021  
(312) 620-7171

**CLEVELAND**  
1440 Snow Road  
Parma, OH 44134  
(216) 749-3080

**DETROIT**  
17117 W. Nine Mile Road  
Southfield, MI 48075  
(313) 569-6560

**LOS ANGELES**  
15445 Red Hill Ave.  
Tustin, CA 92680  
(714) 259-1850  
800 S. Figueroa St.  
Los Angeles, CA 90017  
(213) 624-9810

**NEW YORK**  
225 W. 34th St.  
New York, NY 10001  
(212) 947-6033

**ORLANDO**  
1001 Executive Center Dr.  
Orlando, FL 32803  
(305) 898-9027

**PHILADELPHIA**  
301 City Line Ave.  
Bala Cynwyd, PA 19004  
(215) 667-2990

**SAN FRANCISCO**  
901 Sneath Lane  
San Bruno, CA 94066  
(415) 952-5010

**STAMFORD**  
37 North Ave.  
Norwalk, CT 06851  
(203) 847-6600

**WASHINGTON, D.C.**  
2095 Chain Bridge Rd.  
Vienna, VA 22180  
(703) 893-2400



Let EDP/Temps and CONTRACT SERVICES cure what ails you.  
Call us or send your resume to the office nearest you.

## MARKETING OPPORTUNITIES AT NBI!

Imagine being a part of NBI, where we are dedicated to meeting the challenges necessary to offer total systems solutions in office automation and departmental computing. Our 11 years of success is a result of our ability to design and market a series of word processing and electronic publishing systems, personal computers, and UNIX™ based computers.

### PERIPHERALS PRODUCT MANAGER Department SS

The professional we seek must have a degree in Business or Engineering with MBA preferred, plus 5 to 8 years of successful product management. Requires in-depth experience with scanners, impact and laser printers. Must have ability to deal with OEM suppliers, generate business proposals and manage large-scale projects. Successful candidate will develop product marketing strategy, pricing plans, file programs, and manage expense/revenue plans.

### PRODUCT MARKETING MANAGER Department MC

Requires BA/BS and 3 to 5 years of marketing/sales experience. Knowledge of PC's, PC networking, 3rd party software, DBMS, and UNIX™. Successful candidate will develop and coordinate sales/marketing strategies and programs, research and write MRD's and business plans. Will work and develop product announcements and awards; prepare and conduct customer and VIP presentations.

We offer a competitive benefits package including life, medical, dental and optical insurance, stock purchase plan, 401k retirement savings plan, credit union, and an opportunity to grow with a successful company. Qualified candidates should send resume, with salary history and requirements, noting department code to:



Employee Relations Department  
3450 Mitchell Lane, P.O. Box 9501  
Boulder, CO 80301

UNIX™ is a trademark of Bell Labs  
An Equal Opportunity Employer M/F/H/V No Agencies Please

## MILLSAP'S COLLEGE

### DIRECTOR COMPUTER SERVICES

Excellent opportunity in growth environment. Responsible for Computing Center and all College computer services. Staff includes director and 6 professionals plus student assistants and programmers. Facilities include Digital VAX 11/750 VMS and PDP-11/84 and PDP-11/70 RSTS systems, a Microm data switch, 190 terminals, and 100 personal computers. Prefer: Advanced degree with progressively responsible management experience in computing and MIS in higher education and experience with VMS, RSTS, and personal computing. Good communication and interpersonal skills and the ability to direct the work of others essential. Planning skills, understanding of the academic environment, and organizational ability necessary for success. Some teaching in computing may be possible. Salary competitive and commensurate with qualifications.

Located in Jackson (pop. 250,000), the cultural, financial, and governmental center of the state, the College has a recognized standard of excellence, is financially sound, and has an enrollment of 1200, on all time basis. With a strong liberal arts and science program, strong pre-professional programs, and a School of Management offering the MBA and MBA degrees, the College is a co-educational institution affiliated with the United Methodist Church.

Position available Fall 1986. To be assured of consideration, send resume, academic transcripts, and names of 3 current references by September 1st.

Dr. Robert A. Shive, Jr.  
Associate Dean of the College  
Millsap College  
Jackson, MS 39210-0081  
An equal opportunity employer

### GREATER BOSTON

Boston's thriving economy provides excellent career opportunities for experienced MIS professionals, and Eastern Massachusetts has always offered an outstanding year-round quality of life.

For 20 years ROMAC has been a leader in the placement of MIS professionals. Contact us today - career opportunities in the \$25-60,000 range.

**ROMAC**  
20 Walnut Street  
Wellesley Hills, MA 02181  
617-239-0900

## NEW ENGLAND

### BOSTON IMS DBA

If you have 5+ yrs. of IMS support exp. & seek the step up to mgmt, consider this outstanding oppy. This \$48 org. has multiple IBM 308X's w/IMS-DBDC. Play a key role in all future DBMS growth as co. expands to record size! Salary to \$50,000.

### BOSTON MIS MANAGER

Sophisticated fin'l. svc. firm seeks exec. calibre pro to estab. EDP function at new BOSTON hqtrs. Knowl. of SYS-36 & IBM LAN's desired. If you're a New Eng. area pro seeking diverse challenge w/bonus & stock option pot., call ASAP! Base salary to \$40,000.

### BOSTON VAX ENGINEERING ANALYST

Dynamic engineering firm seeks FORTRAN developer for sophisticated apps. devel. Previous devel. in scientific sys., incl. stress analysis, heat transfer & graphic displays. Excellent mgmt. potential in near term. Salary to \$40,000.

### HARTFORD PROGRAMMER/ ANALYSTS

Major fin'l. org. seeks qualified prog./analysts to work on a number of on-line devel. proj. in a CICS/IMS environ. Min. 2+ yrs. IBM exp. & positions. Co. provides excellent benefits & full reloc. Salary to \$34,000.

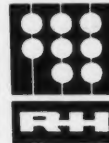
### HARTFORD DATA BASE (IMS, IDMS)

Data base pros seeking growth positions in data base design, data modeling, data architecture & DB sys. programming, investigate multi-oppty's. in HARTFORD area w/IBM/OS/VS/VS/VS install's. Salary \$32-\$46,000.

### PROVIDENCE SR. PROGRAMMER BANKING SPECIALISTS

Major fin'l. org. seeks qualified SPA's to assist in the continued devel. of online sys. Bkgrd. should incl. CICS/IMS & fin'l. sys. exposure. Full benefit & relo. pkg. avail. \$39,000.

## ROBERT HALF



### EDP PERSONNEL SPECIALISTS

Contact the Manager of any office listed below.

100 Summer St., Boston, MA 02110

(617) 423-1200

111 Pearl St., Hartford, CT 06103

(203) 278-7170

900 Turks Head Bldg., Providence, RI 02903

(401) 274-8700

Client Companies Assume All Fees.

## EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies  
and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer management and support.

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems, and languages) to either one of our locations. Our client companies pay all of our fees. We guide you, you decide.

**RSVP SERVICES, Dept. C**  
Suite 700, One Cherry Hill Mall  
Cherry Hill, New Jersey 08002  
(609) 667-4488

**RSVP SERVICES, Dept. C**  
Suite 201, Dublin Hall  
1777 Walton Rd., Blue Bell, PA 19222  
(215) 629-0595

From outside New Jersey, call toll-free 800-222-0153

### RSVP SERVICES

Employment Agents for Computer Professionals

**Systems Analyst - Research, analyze, design, develop and document automated systems. Recommend modifications and new procedures for the bank's overseas branches. Utilize Wang 2200 hardware; OIS system; Assembler, Basic, Cobol, Fortran and RPGII software. Train operations personnel in use of new procedures. Bachelor's degree in Computer Science, 3 years experience. 40 hour week, \$30,675 per year. Mail resume: NYS Job Service, JO #NY8022253, 87-45 Queens Blvd., Rego Park, NY 11374. DOT 012167066.**

### PROGRAMMER/ ANALYST

Arts & Sciences College in Newport, Rhode Island, is presently seeking a qualified individual to fill the position of Programmer/Analyst. Applicants must have experience in designing and developing transaction-oriented processing system applications. Integrated applications will include Student Information System, Financial Information System, and others. Candidate should have experience with an IBM 4381 using VM/CMS and IBM SDS/36, and a minimum of 3 years demonstrated experience. A Bachelor's degree is required, as well as professional references. Send detail curriculum vitae to: Director, Office of Management Information Systems, Salve Regina College, Newport, RI 02840.

## CONTRACTORS

World Information and Network Systems has requirements from Maine to Florida for programmers/analysts with a minimum of 3 years exp.

ADABAS/NATURAL  
IMS DBDC, CICS  
VAX/VMS, FORTRAN, C  
TANDEM, TAL, PATHWAY  
MANUFACTURING  
MICROVAX & DODGE  
SYS PROG (any HW)

IMS/ADSO  
FOCUS  
VSAM CICS  
POWERHOUSE  
MSA, WALKER  
ACF/IMS  
326/38, RPG3

### WINS CORP.

15200 Shady Grove  
Suite 350  
Rockville, MD 20850  
(301) 670-2803

### ANALYST/PROGRAMMER

Rapidly growing sunbelt Excess & Surplus Lines Insurance Company is seeking an individual with 3-5 years experience, 2 years with Property/Casualty Insurance software a must. Candidates must possess proven ability to analyze, maintain and develop codes for both existing and new applications in the batch and on-line systems. There will be considerable involvement with User departments.

We offer a competitive salary and fringe benefit package. Qualified candidates are invited to send their resume with salary history to:

Personnel Department  
Scottsdale Insurance Company  
P.O. Box 8480  
Scottsdale, AZ 85252  
E.O.E.



## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## OPERATIONS ANALYST

Middle South Services, Inc., located in New Orleans, LA., the technical arm of the Middle South Utilities System, has an immediate need for an Operations Analyst. This position is staffed 24 hours/day and is the main link in the resolution of production problems.

The individual we seek will interface with users investigating production failures. You will assist in developing operation disaster recovery plans across all applications.

The successful candidate will have extensive experience in a large scale computer environment as an Operations Analyst. The position requires a thorough understanding of OS/360, TSO, and knowledge of UCC 7/11. The ability to effectively communicate and cope with emergency situations is a must.

Middle South Services, Inc. offers attractive salaries and a comprehensive benefits package. To apply, send your resume to:

**JENNIFER GARY**  
MIDDLE SOUTH  
SERVICES, INC.  
P.O. BOX 61000  
New Orleans, LA. 70161  
1-800-231-4481  
In Louisiana call collect:  
(504) 569-4962

**MIDDLE SOUTH SERVICES INC.**

## INSTRUCTORS

Full or part-time teaching for instructors.

Must have practical experience with Data Communications, PC's and LAN's and experience speaking before groups. Requires domestic and some overseas travel. Opportunity to work with the latest PC and LAN technology. Excellent compensation depends on experience. Excellent benefits. Open to individuals with no previous teaching experience.

Send resume to:  
**Micro Development, Inc.**  
East Campus, P.O. Box 100  
100 B Avenue, Suite 40  
Cincinnati, OH 45202

## CHIEF SOFTWARE ENGINEER

To \$50,000

Minnesota based firm has exceptional opportunity for software professional. Requires 4 year degree in Computer Science, E.E., or math and heavy experience in C/UNIX or Assembler. Pluses are advanced degree, graphics, CAD/CAM.

**SYSTEMS & PROGRAMMING MANAGER/MANUFACTURING**  
\$45,000 - \$50,000

New position at Twin Cities based manufacturer offers challenges in staff management, dept. growth, and strategic planning. MS will lead the way in plant automation and DP development. Requires 4 year degree and track record in manufacturing systems management. Experience in Financial and Sales/Marketing systems a plus.

Call Mark David  
at (612) 339-8001

**ROBERT HALF**  
DATA PROCESSING

3636 IDS Center  
Minneapolis, MN 55402

# Have you run out of room to grow?

If your present company has no outlet for your expanding talents, maybe it's time to try General Dynamics Data Systems Division on



for size. We provide data systems and computer services support for the entire General Dynamics company in such areas as aerospace, information systems, land systems, shipbuilding and electronics. So we have plenty of opportunities. And all the benefits you'd expect from a large corporation.

To find a better fit in *PRODUCT SOFTWARE*, *CAD/CAM*, or *ENGINEERING SYSTEMS*, send your resume to the Vice President and Center Director at the Data Center of your choice.

And get yourself some growing room.

**Western Center**  
P.O. Box 85808, MZV2-5150  
Drawer 047  
San Diego, CA 92138

**Central Center**  
P.O. Box 748, MZ5304  
Drawer 047  
Fort Worth, TX 76101

**Eastern Center**  
100 Winnenden Road  
Drawer 047  
Norwich, CT 06360

## GENERAL DYNAMICS

### Data Systems Division

Equal Opportunity Employer/U.S. Citizenship Required

## LET'S GO!! CONSULTANTS

• Project Leaders • Senior Analysts • Programmers  
Insurance applications with or without database or data communications experience.

**WE HAVE THE WORK  
LET'S MAKE SOME MONEY NOW!**

Assignments in major cities  
Call IMMEDIATELY and send resumes to:

### COMPDATA

The Talent Market  
1016 W. Ninth Ave.  
King of Prussia, PA 19406  
(215) 265-9979

\* Also special needs for IMS, IDMS, ADABAS

The best in the Sunbelt

Prog./Anal's  
DBA's  
Sys Prog's  
EDP Auditors

Immed. openings. Sunbelt & nationwide  
DATACOM/IDEAL CICS  
IMS DB/DC MVS  
ADABAS/NATURAL VIMS/NCIP  
HP 3000/POWERHOUSE S/38  
TANDEM/TAL IDMS-ADS/O

I have been recruiting DP professionals since 1981. At DP recruiter in the country in 1982 (PA), and in 1984 (NY). Largest employment agency in Charlotte, in business since 1975, one of the top 2 agencies in the most productive and oldest network in the country (NY) since 1983, affiliated with 150 agencies from coast to coast. Fee paid.

Rick Young, CPC (704) 386-1880  
DP Recruiting Manager  
Corporate Personnel  
Consultants, Inc.  
2705-320 Lenoire Drive  
Charlotte, NC 28211

## CICS/IMS/VSAM DP Series

(Used by Over 25,000 DP Professionals)

**CICS/VS Command Level Programming with COBOL Examples** By David Lee \$29.95  
Complete & practical! 273 practical examples, 15 sample CICS programs, 295 8.5x11 big pages.

**IMS/VS DB/DC Online Programming Using MFS and DL/I** By David Lee \$29.95  
Adopted by AT&T. It covers all the basics of IMS/VS online programming. 245 practical examples, 9 sample MPP programs, 310 8.5x11 big pages.

**IMS/VS DL/I Programming with COBOL Examples** By David Lee \$29.95  
Complete & practical guide to DL/I batch programming with introduction to IMS/VS Online programming. 212 practical examples, 10 sample DL/I programs, 305 8.5x11 big pages.

**VSAM Coding in COBOL and VSAM AMS** By David Lee \$19.95  
Become a VSAM expert in just one month! A practical guide for COBOL programmers using VSAM files. 14 COBOL sample programs address all VSAM applications. 53 AMS examples to satisfy all your needs to define & maintain VSAM files. 201 big technical-packed pages.

**Order Your Copies Today!** To order by credit card (VISA or M/C), call TOLL FREE 1-800-851-5072 or 214-248-7842 (in Texas). To save S&H charges, send \$29.95/copy or \$24.95/copy (4 or more copies) to the address below. Allow 1 to 2 weeks for delivery. Unlimited Warranty: Full Refund At Any Time If Not Satisfied.

CCD  
ONLINE

**CCD ONLINE SYSTEMS, INC.**

TOLL FREE 1-800-851-5072

10990 Dallas Parkway, Suite 151, Dallas, TX 75246



POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

# Sperry in Albuquerque: Software Design Opportunities

Sperry's defense systems operation in Albuquerque is a leader in developing electronic systems for military aviation. We are currently looking for software design engineers.

To qualify for these openings you should have a BSCS or BSCE degree with two or more year's experience in real-

time software design. Experience or exposure to ADA programming is highly desirable. You should also be familiar with structured analysis and structured design methodologies. We are looking for engineers who have experience in the following areas:

- Systems design
- Real-time operating systems
- Software engineering tools & methods
- Systems programming
- Operations management
- Avionics applications development

## Take this opportunity.

Sperry offers you a generous salary and benefits package. Send your resume and salary history, in confidence, to Brandon Harwood, Sperry, (CW-E701), P.O. Box 9200, Albuquerque, NM. 87119



Equal Employment Opportunity/Alternative Action Employer  
U.S. Citizenship required

## DB2 Professionals

If you are an experienced (two years or more), assertive, upwardly mobile computer professional and have good DB2 working experience, you can benefit by talking to Computer Task Group (CTG). We have openings for DB2 professionals on a national basis.

We are the leading provider of career opportunities for professionals like you. Through a network of forty-five branch offices in major cities across the country, CTG develops information systems for Fortune 500 companies.

We're looking for multi-talented people with large scale system experience to work in challenging environments. CTG offers you the opportunity to enhance your career in a wide variety of specialty areas and in geographical locations of your own choosing. With us you'll be bringing state-of-the-art technology to major clients. You'll have the satisfaction of working on various projects in diverse industries.

CTG offers competitive salaries, a first rate, comprehensive benefits program, extensive educational opportunities - including courses at our own Institute for Technical and Management Training - and a stock plan.

The greatest benefit CTG offers you is our commitment to help our people reach their full potential. Come grow with us!

Send your resume to Mr. Robert Buster, Manager, Corporate Recruiting, at 800 Delaware Ave., Buffalo, NY 14209

**CTG COMPUTER TASK GROUP INC.**

CTG is an equal opportunity employer.

## CALIFORNIA

Exciting opportunities providing services and products to our clients who are top California companies in Finance, Entertainment, Distribution and Manufacturing. Permanent positions available in the following areas:

### SALES

IBM Mainframe sales experience with proven record. Some west-coast travel. Salary plus commission.

### PROGRAMMERS

IDMS-ADS/O experience with 5.7 or 10.0.

EXCELLENT BENEFITS. Send resume to:

**MACAULAY & ASSOCIATES**  
11727 Berrington Court, Suite 208  
Los Angeles, CA 90049  
(213) 471-8881



## SYSTEM CONSULTANTS

- SAN FRANCISCO BAY AREA -

These positions can bring large Rewards, High Satisfaction, Major Challenges & Tremendous Growth.

SKILLS REQUIRED INCLUDE:

IMS, IDMS, CICS, COBOL, ALC, JCL with TANDEM, IBM, DEC-VAX, HP.

LOGICAL OPTIONS

Interested Agency: (415) 777-3880

San Francisco, CA 94105 • (415) 777-3880

## FLORIDA CONNECTION

### ALL EXPENSES PAID

Our clients, in urgent need of your expertise, will pay all your expenses in relocating you to an area of sun and fun. No state tax, average temperature 75°! Call Today!

Programmer Analysts  
Systems Analysts  
Systems Programmers  
Data Base Analysts

AVAILABILITY, INC.  
813 872-2631  
Dept. C, P.O. Box 25434  
Tampa, Florida 33622  
Since 1969

## PROJECT ATHENA OPENINGS

Join Project Athena, a major \$70 million initiative to enhance education at MIT through the establishment of a campus-wide network of high-performance DEC and IBM workstations. The following positions are currently available:

**SYSTEMS PROGRAMMERS** - to join a Systems Development Group in building network-based services for a multithousand workstation environment. Existing projects include name-, authorization-, file-, and notification-servers, the X-window system, and more. Multi-vendors; public and private access workstations; and developmental support for an educational applications group complete the picture. Bachelor's degree or equivalent combination of education and experience is required. Three-five years' experience in UNIX systems programming required. Familiarity with BSD network facilities and with Fortran and Lisp preferred. (A86-768)

**CONSULTANTS** - (both full-time and 20 hr. week positions available - some require evening work) - to provide consulting to students/faculty using standard and user software and on-line consulting tools; provide feedback to User Services about operations in the field and technical training to users. Several positions will deal with delivery of educational services and development of training programs. Bachelor's degree or equivalent combination of education/experience and experience working with computer users required. Experience with UNIX or UNIX-like operating systems and with variety of end user software also required. Computing experience in university and/or networked environment preferred. One position requires minimum of three years' experience, proven supervisory skills, and ability to provide technical leadership for consulting team. (A86-770)

**TRAINING MANAGER** - (part-time position) - to provide training programs for end users of Athena's standard applications and systems software. Will evaluate the training needs of general users, plan and implement training for students and faculty and compare it with similar business and university environments. Bachelor's degree or equivalent combination of education/experience required. First-hand experience with UNIX or UNIX-like operating system, UNIX utilities, full-screen editors, and familiarity with one or more computer languages required. Experience in preparing technical educational materials and establishing training services also required. Excellent communication skills essential. (A86-779)

**TECHNICAL WRITER** - to write and update Project Athena's user documentation set; work with faculty and staff to determine needs; participate in design of Athena's systems and services; test pre-release software. Bachelor's degree or equivalent experience and one year technical writing experience necessary. Strong "under the hood" technical background including knowledge of at least one programming language, computer editors and formatters. Experience in university setting, UNIX system, application area knowledge strongly desired. Writing sample required. (A86-740)

**APPLICATIONS CONSULTANT** - to assist in development of educational software to be used for both curriculum development and technical coherence. Bachelor's degree and 3-5 years' experience in 2 of the following languages: C, Fortran and Pascal necessary. Part-time position (20 hours a week). (A86-739)

Please send 2 copies of resume, referencing appropriate job number and writing sample, as necessary to: Sally Hornsby, MIT, Personnel Office, E18-230, 77 Massachusetts Ave., Cambridge, MA 02139.

MIT is an equal opportunity/affirmative action employer.



## COUNTY OF VOLUSIA, FLORIDA

### SR. PROGRAMMER ANALYST

Salary: \$24,440 - \$36,385. Closing: July 28, 1986. Minimum requirements: Graduation from 4 year college or university with a degree in Mathematics, Computer Science, Data Processing, or related field and 2 years progressively responsible experience as a Programmer Analyst or equivalent. Graduation from High School or possession of GED and 3 years of computer programming experience or A degree in Computer Science and 1 year of computer programming experience, or equivalent combination thereof, may be substituted for a bachelor degree. Related work in criminal justice application plus heavy experience in CICS on an IBM DOS/VSE machine preferred.

Request application in person, by letter, or phone. Personnel Division, P.O. Box 429, 135 W. New York Ave., Deland, FL 32721-0429. (904) 736-2700, 257-6000 Ext. 2220 M-F betw. 8:30 a.m. and 4:00 p.m. Certain veterans and certain spouses of veterans receive preference in employment as provided for by state law. Volusia County is an EOE.

## ELECTRICAL ENGINEER

Georgia Institute of Technology, a leading academic and research institution has an immediate opening in the Communications Department for an Electrical Engineer. Your duties would include major responsibility for the planning, designing and implementing the campus interior and exterior table plant to support the voice, data and video communications systems. To qualify you should have a bachelor's degree in Electrical Engineering; 1 to 2 years experience in the design and maintenance of digital data, communications systems and a thorough knowledge of voice, data and video communication principles. We offer a very competitive starting salary, an excellent benefits package and flexible working hours for those who wish to pursue an advanced degree at the Institute. For prompt consideration send a letter of application and a resume to Ms. Lynn Wilburn, Employment Interviewer, Personnel Services Dept., Georgia Institute of Technology, 975 Henshaw Ave., Atlanta, GA 30332.

Georgia Institute of Technology is an equal education/employment opportunity institution

## SYSTEMS ARCHITECT

Direct the design and technical development of computer systems, including full project life cycle development, requirements definition, function specifications, coding, testing and product build-up. Must have a minimum of ten years of experience in the design and development of IBM-based systems and the design of multi-programming, multi-processing systems, networks, and data bases. Must have demonstrated technical leadership, experience and possessing at least a BS degree. Position requires a combination of technical knowledge is required. Annual salary: \$95,000. Send resume to: Manager, Human Resources Services, IBMCT, Two Broadway, 20th Floor, Suite 1, New York, NY 10004. An equal opportunity employer M/F.

## Why Gamble On A Career Move?

"Why roll the dice with an unproven firm, you have the number of the most exclusive research firm serving Commercial Banking." ----- Current Openings ----- Loans, DDA, Bankcard, On-line Teller, Check Processing, Home Banking, Leasing, Wire Transfer, C/P, ATM, Platform Automation, Programmer, Senior Programmers, Project Leaders, Project Mgrs., Systems Analysts, Senior Systems Analysts, DBA's, AWP Level, VP Level.

Andy W. Park, Vice President  
919 493-5444  
Banking & Retailer Search Division  
Bentley and Associates, Inc.  
280 Eastmore Drive, Suite 200  
Chapel Hill, NC 27514  
 fees assumed by client companies

## Systems Analyst - Design, develop, install, software and systems integration of digital transmission systems for computer network office automation (local area networks) and packet switching networks. Select appropriate technologies and equipment, ensuring compatibility of physical and comm. layers of processing units with network equipment. 370 (303), 424 (1) IBM, TANDEN, 1000 & 3000 HP, PDP/11, micro and word processors, asynch., daych, IBM (2780, 3270), SOLC, HCLC and 5.25 level 2. Master's degree in Electrical or Communications Engineering required. Plus 2 years experience of 2 years related experience as telecomm. engineer. Mail resume to: NYS Job Service, J.O. #NY024234, 175 Ramen St., 2nd Floor, Brooklyn, NY 11201.



## POSITION ANNOUNCEMENTS

## CONSULTANTS

Advanced Programming Resolutions, Inc., a dynamic, growth-oriented, computer consulting company specializing in software design and development within a UNIX/C environment has expanded its Columbus based operation to include Chicago.

## We offer:

- Challenging Software Development
- Career Path Opportunities
- Professionalism, Quality and Integrity

## Must have:

- Degree in Computer Science or Equivalent Work Experience, Master's Degree a plus.
- 1 Plus years minimum work experience in any of the following:
  - UNIX/C, Shell Programming
  - Real-time software development, design and debugging skills
  - Switching Systems requirements and architecture design
  - UNIX internals
  - Call Processing

## OUR SUCCESS IS OUR PEOPLE!

Please submit your resume to:

Robert D. Williams  
Advanced Programming Resolutions, Inc.  
2715 Tuller Parkway Drive  
Dublin, Ohio 43017  
(614) 766-8901

An Equal Opportunity Employer M/F/H/V

UNIX is a trademark of  
AT&T Bell Laboratories



## IMMEDIATE OPPORTUNITIES

IMMEDIATE OPPORTUNITIES CURRENTLY exist for skilled DP professionals with the following skills:

**SYSTEM 38** - Requires RPL III experience. Salaries \$18-41K.

**SYSTEMS PROGRAMMERS** - MVS, VM, and DOS opportunities. Salaries \$26-54K.

**DATABASE SPECIALISTS** - IDMS, IMS, ADABAS, MODEL 204, and DMS 1100 designers, programmers and DBA's needed. Salaries \$26-59K.

**UNIX/C** - Software engineers and systems programmers. Salaries \$27-49K.

**IBM PROGRAMMER ANALYSTS** - COBOL and/or ALC opportunities for programmers and project leaders. Salaries \$22-37K.

**MISC. OPENINGS** - HP3000, DEC/VAX, TAND-DEM, CDC and UNIVAC openings available. Salaries \$23-60K.

Positions are available in Northeast, Sunbelt and West locations.

For more information call Tom collect at (301) 840-0460 or send resume to

J. Randall Associates  
P.O. Box 1521  
Rockville, MD 20850  
Attn: Tom Arnold

## NY METROPOLITAN AREA BANKING - IBM

## • Data Comp Specialists

V.P. level opportunities  
Networking, X.25 packet  
switching, 3-5 yrs exp.

## • Project Leaders

COBOL, DB DC, database adminstr

## • Programmer Analysts

COBOL-Design application, strong BAL

## • Data Administrator

DB DC

## • DEC

VAX VMS BASIC, 3 yrs exp.

## • Programmer Analysts

VAX VMS BASIC

Call 212-398-9891

or submit resume to:

HANK WALSH ASSOCIATES

16 W. 40 St., NY, NY 10018.

# When you don't have time to find the job you want

Searching for a better job can be a full time job. That's why so many data processors, who want to make a change, don't. Or worse, they take the next job offer that comes along.

If you can relate to this problem, Robert Half-Data Processing may be just perfect for you.

We're sensitive to the problem of the data processing professional, who wants to be fair to the present employer, and at the same time finds it necessary for career advancement to look for another job. Robert Half has been successful at discretely locating the right career positions for data processors—ever since the computer revolution began.

We can help you just as we've helped thousands of other professionals for almost 40 years.

If you must make a change, but can't spare the time for an interview during work hours, just call one of our 100 offices on three continents during a regular work day. Briefly explain your problem to one of our placement professionals, and we'll set up an in-depth phone interview at your convenience—after hours or on the weekend. If it's convenient for you to meet with us, so much the better—we'll arrange the interview.

And if you don't have a current resume, we'll discuss all the pertinent facts with you and compile them for presentation to suitable employers.

Please understand this: Our service is 100% free to you. And, equally as important, we're success oriented. This means our clients only pay our fees when they hire through us. This makes us better. *A lot better.*

So, if you're interested in finding a better data processing job, call one of our nearby offices. A few moments of your time now, may be the beginning of a new and brighter future.



**ROBERT HALF®**  
**DATA PROCESSING**

© 1986 Robert Half International Inc.  
Offices independently owned and operated.

## MIS Director

A major paper distribution company, headquartered on Long Island, currently seeks an experienced DP professional to join the senior management team and play an important role in the development of an integrated MIS function.

Responsibilities will include: establishing a telecommunications network between corporate and regional offices; long range systems planning; hardware/software selection; preparation of functional and technical design specifications; design of transaction systems applications (e.g. order entry, inventory, etc); user liaison and requirements analysis; installations planning and coordination; and supervision of a staff of 4-6 Programmer/Analysts.

Qualified candidates will have a minimum of 5 years DP experience, preferably in an IBM System 34/36 or 38 environment, with at least 3 years as Project Leader or DP Manager. Background in mini/micro computer and telecommunications projects in a multi-location wholesale distribution system is required. College degree necessary; advanced degree preferred. Some travel expected.

The position reports to the Chairman, and salary begins in the low \$60's depending on experience. Please send resume and salary history in confidence to:



**Corporate Resources, Inc.**  
18 EAST 48TH STREET, NEW YORK, NEW YORK 10017

No telephone inquiries; only qualified candidates will be contacted.

An equal opportunity employer.

### UNIVERSITY OF ARKANSAS FOR MEDICAL SCIENCES DIRECTOR FOR COMPUTER SERVICES

The University of Arkansas for Medical Sciences (UAMS) is one of five campuses of the University of Arkansas. Located in Little Rock, it is a comprehensive health sciences center, enrolling approximately 1,500 students in colleges of medicine, pharmacy, nursing, the health related professions and the graduate biological sciences. UAMS operates a 340 bed University Hospital, has an annual operating budget approaching \$130,000,000 and approximately 3,500 employees.

This position reports directly to the Vice Chancellor for Administration and Fiscal Affairs, directs a staff of 54 and is responsible for overall direction of computing services supporting the education, research, hospital, and administrative functions. The computing environment includes IBM 4381 Mod 3, a PDP 11/44, and a DEC 10 which will be replaced within the year.

Candidates should have a Bachelors or advanced degree in a computer related area and a minimum of 5 years in administrative or supervisory capacities in a Data Processing environment. Experience in higher education systems and strong managerial skills will be a definite advantage as the candidate must have the ability to work in a team relationship with faculty, staff and students. UAMS offers a competitive compensation and benefits package. Interested candidates should submit current and complete resumes with the names of three references by August 15, 1986 to:

Dr. Frederick Jelovsek, Chairman  
Director for  
Computer Services Search Committee  
4301 West Markham, Box 518  
Little Rock, Arkansas 72205  
UAMS is an equal opportunity employer

### PROJECT LEADER/MIS

We are a large, rapidly growing multinational publishing and research organization with an immediate need for a talented technical leader for a group of 6 programmers. Experience directing development of both on-line and batch systems in an IBM DOS environment is required. 3-5 years Cobol experience is a must. Knowledge of CICS, CCA Model 204 and DEC VAX are all a definite plus.

We offer good pay, depending on experience, excellent working conditions, profit sharing, and comprehensive benefits, including dental coverage. You will also have the opportunity to grow with an information services company that includes the world's largest publisher of computer-related newspapers and magazines (including *Computerworld*, *InfoWorld*, and *PC World*), and the largest information industry research firm in the world.

Please send your resume and salary requirements to Lois Green, IDG, 46 Park Street, Framingham, MA 01701.



We are an equal opportunity employer.



## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## COLLEGE OF ENGINEERING AND PETROLEUM

### Department of Electrical & Computer Engineering

### KUWAIT UNIVERSITY

### STATE OF KUWAIT

The Department of Electrical & Computer Engineering invites applications for a position in the fields of assembly language and microprocessors, data bases, operating systems, theory of programming languages, and computer organization. Primary responsibilities would include teaching and developing of research in the area of Computer Engineering and Computer Science. Candidates should hold an earned doctorate degree. All academic ranks will be considered commensurate with experience and qualifications:

Application forms and conditions of service may be obtained from:

Kuwait University Office  
Embassy of the State of Kuwait  
3500 International Dr. N.W.  
Washington, D.C. 20008

Completed applications, together with representative publications and non-returnable copies of academic qualifications must be returned to:

Recruitment Office  
College of Engineering and Petroleum  
Kuwait University  
P.O. Box 5969  
KUWAIT

by August 31, 1986 to be considered for the 1987-88 academic year.

The College of Engineering and Petroleum at Kuwait University consists of four departments: Chemical, Civil, Electrical and Computer, and Mechanical Engineering. About 1500 students are enrolled in the undergraduate program and 100 in the Master's Degree Program which started in September 1985. English is the language of instruction and teaching is based on the semester credit system. The College has eighty eight (88) active faculty members. Research facilities are available in terms of Library and Computing Services and well-equipped laboratories. Research funds are available through the Research Management Unit at Kuwait University, government and private sectors. Frequently, the College offers short intensive courses to industrial and governmental personnel.

#### IMS/CICS SYSTEMS PROGRAMMERS

*Of All The Reasons To Work At  
General Re Services Corporation,  
This is The Most Selfish:*

#### The chance to learn!

If you're up to the challenges presented by our state-of-the-art multi-CPU/IMS environment, you might be the kind of systems programmer we're looking for.

You will be responsible for programming IMS systems software, as part of a strong Systems group which also supports 12 CICS regions for our 15 branches nationwide.

We seek 2 years' experienced Systems programmers or applications programmers interested in systems programming with one of the following:

- strong Assembler
- strong Assembler/IMS or any compatible data base
- strong Assembler/CICS

Night positions are also available. We offer competitive salaries, great benefits and the opportunity to expand your systems knowledge. Relocation assistance is available.

If you're interested and you think you qualify, give us a call on Tuesday or Wednesday from 7:30AM-7PM at (203) 328-5358. Or send your resume and salary requirements to Matthew J. Perlman, Manager of Professional Recruiting, General Re Services Corporation, Financial Centre, P.O. Box 10353, Stamford, CT 06904-2353. We are an equal opportunity employer m/f/h/v.



**Lachman Associates, Inc.**  
Committed to Software Excellence!

LAI is a systems software development and consulting firm needing computer scientists/engineers with expertise in UNIX®, MVS, C, Teletype, and Networking! We promote the professional growth and fulfillment of our staff by providing a wide range of high quality services and products for our clients.

Opportunities in network communications, systems and telephony software, and systems admin/testing in Chicago, Columbus, Denver, Florida, and other locations. Geographical flexibility a real plus! For further information, please contact:

Lachman Associates, Inc.  
Attn: Staffing-CW  
845 Blackhawk Drive  
Westmont, IL 60559

UNIX is a registered trademark of AT&T

#### DATA PROCESSING OPPORTUNITIES

#### 1-800-423-5383

Our clients in the SUNBELT and throughout the U.S. have HUNDREDS of current needs.

LIFE/70 or LIFE/COMM	To \$60K
SYSTEMS PROGRAMMERS	\$ OPEN
DATA COMMUNICATIONS	To \$64K
DBMS, IMS or ADABAS DBA's	To \$50K
P/A (IBM COBOL or ALGOL)	To \$40K
CONSULTING	\$ OPEN
TELEPHONE PBX	To \$55K
SOFTWARE ENGINEERS	To \$45K

#### SAUDI ARABIA

P/A, COBOL, CICS, DL/1, MVS To \$54K

Call or send your resume to:

ROBERT SHIELDS & ASSOCIATES  
P.O. Box 890723, Dept. C  
Houston, Texas 77289-0723  
In Texas Call: 713/488-7961

#### DUNHILL OF ANDERSON

#### YOUR EXTENSION TO

#### DATA PROCESSING PROFESSIONALS

It only takes a call to Dunhill of Anderson to ascertain job opportunities available to Data Processing Professionals on a national basis.

Our office specializes in locating experienced Programmers, Programmer Analysts, Systems Analysts, and Systems Programmers for the most respected corporations in the nation.

We don't require an obligation and never charge a fee. All matters are held in strictest confidence.

Please call or mail resume to:

Ammie Thompson  
Computer Specialist  
Dunhill of Anderson, Inc.  
P.O. Box 2385  
Anderson, South Carolina 29622  
1-803-224-7817 (Collect)

#### EUROPE, ASIA, S. AMERICA...

ANALYSTS MAPICS II ANALYST	34-40K
IMS P/A (1-2 yrs)	25-36K
BURR Design, Degreed (4 yrs)	31-40K
TANDEM P/A Pathway (2 yrs)	27-35K
HONEY P/A QDOS (1 yr)	24-32K
HP2000 P/A Menu (2 yrs)	24-33K
PRIME P/A PRIMOS (2 yrs)	25-30K
CICS P/A MVS Design (2 yrs)	26-33K
IMS AD50 P/A (1 yr)	27-31K
MVS Sys Prog (2 yrs)	30-40K
Sys 38 Design, Menu (3 yrs)	35-39K
PL-1 P/A (2 yrs)	24-30K
Jr. DBA need 3 yrs IMS as P/A	33-37K
EDP Auditor (2 yrs)	30-48K

You get RESULTS with the Premier MS Agency of the MIDWEST. National Network also available. Send Resume or call JIM KRIENEN 9 A.M. - 7 P.M. E.S.T. at (513) 783-7373. Client Paid.

RIETHILLER & ASSOCIATES  
Dress Executive Center  
7365 Kenwood Road, Suite 273  
Cincinnati, OH 45226-4405

## TIRED OF CHANGING CAREER CHANNELS? TUNE IN TO NIELSEN MEDIA RESEARCH

### DATA PROCESSING PROFESSIONALS

### ... Model 204, PL/1, SAS

### Career Opportunities in Florida...

Explore the data processing demands of the future with Nielsen Media Research, the television ratings company, where a strong commitment to professional and technological development is backed by our prominence and success. Right now, you can join us as we meet the challenges of the future in a stimulating IBM 3090-200 environment.

We are presently seeking experienced PROJECT LEADERS, MODEL 204 ANALYSTS and SENIOR LEVEL USER LANGUAGE PROGRAMMERS who have worked in the analysis, design, and implementation of on-line and batch Model 204 applications. In addition, we are seeking MODEL 204 DATABASE SPECIALISTS who have experience in the design of Model 204 Databases.

We are also seeking SENIOR LEVEL PROGRAMMERS with PL/1 or SAS experience.

In return, we offer an excellent compensation package, including tuition reimbursement, relocation assistance... and the security of knowing you're keeping company with the best in the industry. Not to mention the special leisure time benefits of our outstanding location, just minutes from the white, sandy beaches of Florida's Gulf Coast in the Tampa Bay area.

For consideration, please submit your resume to: BILL WEGNER, SENIOR HUMAN RESOURCES ANALYST, NIELSEN MEDIA RESEARCH, 375 PATRICIA AVENUE, DUNEDIN, FL 33528.

No Agencies Please. An Equal Opportunity Employer M/F/H/V

### Nielsen Media Research

EB a company of  
The Dun & Bradstreet Corporation

#### PROGRAMMER

#### MAINFRAME TO P/C

-- \$35,000--

3+ yrs Micro exp coupled with accounting or systems degree will enable you to land the IBM TSO, SP, VM, JCL position. If you like designing PC to mainframe applications than this newsworthy organization is for you! FEE PAID

ROBERT WALF  
OF NEW YORK, Inc.  
522 Fifth Avenue  
New York, NY 10036  
212-221-6500

The EDP Specialist  
Specializing in career placement of EDP personnel of all disciplines. Our nationwide clients offer opportunities spanning the full spectrum of the Data Processing and Software/Hardware Engineering Field.

TRIMBEC GROUP

Send resume, salary history and geographic preference to:  
Adele Durham, Data Processing Division, Drawer 40,  
Livestock, N.Y. 12086

(315) 451-4220

DIRECT CONTRACTS  
N.Y., N.J., CONN., & L.I.  
PRINCETON  
INFORMATION LTD.  
Leading Contracting Company  
to \$550/day

All skills welcome including:  
• Realtime PASCAL  
• UNIX C  
• VAX Cluster  
• X.25 SNA  
• DBMS AD50  
• Automated Warehouse  
• Radar Software  
• DB2

2 PENN PLAZA, NY, NY 10001  
212-563-5030

#### COMPUTER PROGRAMMER

Plan, design and develop application programs for turbo machinery components and CNC machinery utilizing advanced concepts and techniques. Interface with operators and O.C. dept. Assist CNC operators in applying generated programs. Study and improve existing systems and develop new systems. Plan and schedule system design programming, testing and implementation. Extensive background in turbo machinery field req'd. 4 yrs exp. 40 hrs/wk. \$65.85/week. Job site & interview. Pacoma, Ca. Send ad & resume to 11035 Sutter Avenue, Pacoma, Ca 91331, Attn: Pat Harrison.

#### MANAGER OF PROGRAMS/SYSTEMS DEVELOPMENT

Altamonte County, Virginia, at the foot of the Blue Ridge Mountains, is seeking a manager for the systems development function, supervision of programming staff, and serving as Deputy Director of the Information Services Department. The candidate should have a degree, strong knowledge of GENERAL and systems programming, and a high level of expertise in COBOL, ENVIRONMENT, IBM 4381 MVS. SALARY: Entry level not to exceed \$29,357-35,786. Applicants may request information by contacting:

Personnel Office, 401 McIntire Road, Charlottesville, Virginia 22901-4596, (804) 296-5827. Deadline: July 31, 1986

#### FREE RESUME SERVICE

Even though we are a recruiting firm, we do offer a free resume service. Write or call for a resume preparation form. Complete the form and mail to us and we will return a completed resume to you. This is a confidential service with no obligation.

Call (919) 378-1261  
Adkins & Associates Ltd.  
P.O. Box 16062  
Greensboro, NC 27416

#### DALLAS/SAN ANTONIO

Immediate positions for the following skills...  
• DBMS DBA, CAS, MVS/XA ..... To \$50K  
• DBMS Prog. Manager, AD50 ..... To \$50K  
• DBMS Prog/Analyst, ALGOL ..... To \$50K  
• DB2/SQL Analyst ..... To \$45K

#### SAN FRANCISCO

• DB2/SQL Analyst ..... To \$45K  
• DBMS P/A, Learn DB2 ..... To \$40K  
• DATACOM/IDEAL Analyst ..... To \$45K

Please call or send resume in confidence to:

Harold M. Harrison  
Information Technology Search Consultant  
8700 King George Drive, Suite 102  
Dallas, Texas 75225  
(214) 838-0058

#### Data Communications Sales Rep

Leading data communications equipment distributor seeks enterprising, established sales representative. Must have own customer base. We provide all essential administrative services: invoicing, receivables, and order processing. We also support with nationwide space and direct mail advertising "call forwarding" to field locations, equipment warehousing, and technical customer service from our corporate headquarters. Send resume to P.O. Box 367, Ashland, OH 44805.



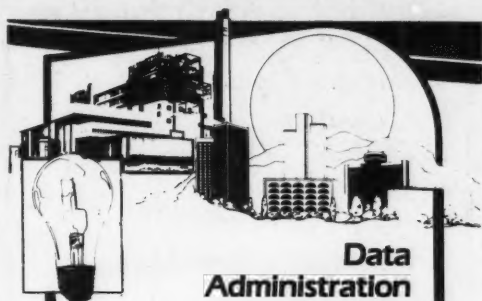
## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS



## Data Administration Specialist

### Join Arizona's Largest Public Utility

As Arizona's largest public utility, we've been keeping the spirit strong for over 75 years...a spirit reflected in our dedicated people. As we continue to meet the energy needs of our community, we are currently seeking Computer Professionals to work in our state-of-the-art environment using systems such as IBM 3084 and 3033 with MVS/XA, VM, CICS, IMS and dual IBM 3800 M3's. Our Distributed Data Processing is supported by IBM 4381's with extensive on-line PC systems and terminal/printer network. Our operating environment includes TSO/SPF, VM/CMS, 4 GL support development tools, and COBOL, along with a wide variety of structured methods.

We are currently seeking individuals with at least 2-5 years data administration experience specifically in logical/conceptual data base design or data information modeling. Familiarity with the electrical utility industry and a BS in Computer Science or equivalent is preferred.

SRP offers a competitive salary, extensive benefits and excellent potential for professional growth. In addition, we are located in the Valley of the Sun, where our refreshing, outdoor lifestyle and abundant recreational activities match our year 'round climate. For consideration, please send resume to: S. Kranicz, Salt River Project, Dept. CW707, P.O. Box 52025, Phoenix, AZ 85072-2025.



An Equal Opportunity Employer.

## USWEST

Advanced Technologies

US WEST Advanced Technologies is the research and development division within the US WEST. Advanced Technologies is responsible for design and development of new products in the communications field. US WEST AT is seeking qualified Systems Engineers who are interested in expanding their capabilities with a dynamic organization.

### TECHNICAL DIRECTOR

Qualified candidates will have technical expertise in PBX and switching technology, software design for PBX and applications. Requires software skills in languages such as: COBOL, PASCAL, C and Operating Systems UNIX, MS-DOS. Must be current in networking protocols.

We offer competitive compensation package programs which include salary and benefits.

We are an equal opportunity employer.

Reply to CW-84804  
Computerworld  
Box 9171  
Framingham, MA 01701-9171

### Major Search

## MIS DIRECTOR SOUTHERN CALIFORNIA

- Fortune 100 Division
- Multiple IBM CPU's
- Heavy development
- Major financial product
- 120 people
- \$6 million dollar budget
- Degree required

We are an equal opportunity employer offering outstanding compensation/benefits. Send confidential reply to: Box CWB-4803, Computerworld, Box 9171, Framingham, MA 01701-9171.

# Information Systems Professionals

Chart your future with America's fastest-growing computer consulting firm.

	Boston, MA	Chicago, IL	Dallas, TX	Denver, CO	Hartford, CT	Houston, TX	Los Angeles, CA	Northern New Jersey	New York, NY	Philadelphia, PA	Providence, RI	San Francisco, CA	Tulsa, OK	Westport, CT
IDMS														
ADS/O														
HP-3000														
PL1														
APL														
DEC VAX														
ADR (DATA COM)														
IDEAL														
RPG III S/38														
CICS														
IMS DB/DC														
ADABAS														
NATURAL														
FOCUS														
NOMAD														
SQL														
DB II														
RPG II S/36														
UNIX/C														
MICRO MAINFRAME LINX														
OS/COBOL														
TANDEM														
TAL														

We've got a steady flow of interesting information systems assignments. We need experienced specialists who are up for new challenges.

We offer highly competitive salaries, a comprehensive benefits package that includes medical and dental, an attractive bonus plan, and 100% tuition reimburse-

ment. If you're ready to chart an exciting new career direction, call directly to the location of your choice:

Boston, MA (617) 237-2822  
Chicago, IL (312) 852-8650  
Dallas, TX (214) 869-1161  
Denver, CO (303) 980-0097  
Hartford, CT (203) 233-9848  
Houston, TX (713) 661-3821  
Los Angeles, CA (213) 868-9616  
New York, NY (212) 481-7778  
Philadelphia, PA (215) 337-3777  
Providence, RI (401) 722-8970  
San Francisco, CA (415) 777-3344  
Tulsa, OK (918) 584-1040  
Westport, CT (203) 232-7190



## Computer Assistance

Making the promise of the computer a reality.

### MOVE SOUTH NOW!

Our computer can help you get here or stay here. 15+ years placement experience, carefully selected affiliates, company clients from Virginia to Texas to Florida. A confidential job search at no expense to you. Call or write:

Data Resources Division  
Lundrum Personnel Resources  
P.O. Box 15690C  
Pensacola, FL 32514  
CALL TOLL FREE (800) 874-2407  
IN FLORIDA (904) 477-8022 COLLECT

### DATA BASE ADMINISTRATOR

State-of-the-art service-based shop in St. Louis needs your knowledge in relational data base design. The position offers responsibility in design and support of their DB II data base. Must have at least 4 years experience in relational data base. Any exposure to DB II is a plus. Salary to \$40,000.

ROBERT HALL  
DATA PROCESSING  
7730 Fennell Blvd.  
St. Louis, MO 63168  
(314) 727-1636

### LABORATORY AUTOMATION ANALYST

Merrell Dow Research Institute, engaged in pharmaceutical research in Cincinnati, Ohio has an immediate opening for a Laboratory Automation Analyst.

This person will investigate solutions to our basic drug research laboratories' requirements for automated data acquisition and processing. They will document, evaluate, design and implement solutions. The successful candidate must work well with scientists, statisticians and computer professionals. Applications projects will require interfacing lab instrumentation such as polygraphs, pressure transducers, and oscilloscopes to microprocessor systems (IBM PC's) to collect, pre-process, display and store data in a real-time environment. These applications are typically implemented in compiled BASIC under PC-DOS.

Minimum requirements are a BS in electronics engineering, biomedical engineering, computer science, physics or related fields with 1 or more years experience implementing real-time data collection systems. Experience in BASIC and FORTRAN is required. Familiarity with Data Translation I/O boards and software is helpful.

Send resume and salary requirements to:

Merrell Dow

Personnel Services Manager

MERRELL DOW  
RESEARCH INSTITUTE  
2110 East Galbraith Road  
Cincinnati, OH 45215  
Equal Opportunity Employer M/F/H/V



## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## EDP SPECIALISTS FOR BANK IN LAGOS NIGERIA

A leading Bank in Lagos Nigeria, has immediate openings for Data Processing Professionals who are interested in working in their Computer Centre in Lagos, developing local expertise in the area of Financial and Data Base Management Systems. The successful candidates will set up the functions, assist in selection of the staff in these areas and provide leadership and guidance for the successful take-off of these very vital functions. Renewable three-year contracts will be offered to the successful candidates.

### 1. SENIOR FINANCIAL SYSTEMS ANALYST

As our Senior Financial Systems Analyst, you will support our entire Finance Division applications development which is based on General Ledger: Millenium (GL: M) by McCormick and Dodge.

Qualified applicants should have a minimum of three years experience in the implementation and maintenance of GL: M or GL PLUS. Experience as a project manager on Financial systems with comprehensive background in Finance and Accounting will be a distinct advantage.

### 2. DATA BASE ADMINISTRATOR

We require a person with strong organizational and communication skills to lead a start-up effort in the Data Base Administration/Data Dictionary area. DataManager experience required and Data Modeling experience an advantage.

In this exciting new position you will be involved in the acquisition of an appropriate DBMS for the bank, Data Base development and design, and play a key role in shaping our Corporate Data Base environment. Specific responsibilities will include planning and supporting the development of data base applications, directing data base design and developing standards and procedures.

### THE BANK.

The United Bank for Africa Limited (UBA) is one of Nigeria's largest banks. With assets of over \$4.8 billion and about 130 branches spread all over Nigeria, the bank has an impressive growth rate. Internationally rated in the top 300 banks in the world.

The Bank has installed a twin configuration of IBM 4341-2 running in a DOS/VSE environment. On-line programme development is provided via ADR-VOLLE; CICS is also used for online applications. The branch banking network is supported with POP-11/24 systems and local area networks of micro-computer systems.

### Conditions of service include:

- Excellent Remuneration package;
- Paid travel for self and family;
- Fully furnished accommodation;
- Car and driver; and
- Other Expatriate benefits (for non-Nigerians).

We invite you to explore the opportunity of working overseas with us by sending your resume to:

**THE GENERAL MANAGER  
UNITED BANK FOR AFRICA LIMITED  
NEW YORK BRANCH  
551 MADISON AVENUE  
NEW YORK, N.Y. 10022  
U.S.A.**

OR

**THE REPRESENTATIVE  
UNITED BANK FOR AFRICA LIMITED  
PLANTATION HOUSE  
5 - 8 MINCING LANE  
SUITE 2-7A  
LONDON EC3N 1BJ  
UNITED KINGDOM**

## ARIZONA STATE UNIVERSITY COMPUTING SERVICES

Arizona State University is a major urban educational institution with a student enrollment exceeding 40,000. We currently operate Amdek V8 and IBM 3081K mainframe computers (VM/CMS and MVS); Tandem, DEC PDP 11/70, and IBM 4381 minicomputers; and several large microcomputer networks. These systems support both the administrative and the academic computing communities of the University. We are interested in candidates who are highly service oriented and who want to work with state-of-the-art tools.

The following position is currently available in our organization:

### COMPUTER COMMUNICATIONS SPECIALIST

OPEN UNTIL FILLED

One position is available in Data Communications Services for a Computer Communications Specialist III. Responsibilities include the design, development, operation and maintenance of channel attached and remote high speed communications network facilities. Minimum qualifications are a Bachelor's degree in Communications Systems Engineering, Electrical Engineering or related field and one year of data network experience, or three years of communication system design, implementation, operation or maintenance experience including one year experience with high speed circuit or packet switched data networks. Prefer applicants with IBM software and hardware network experience, a working knowledge of IBM PDP and compatible systems (including local area networks), familiarity with other terminal networks (DEC, Tandem), and exposure to broadband network capabilities.

Salary from \$24,960-\$29,952 DOE

To apply for any of these positions, send resume to or apply to the Personnel Department, Arizona State University, Tempe, Arizona 85287. Computing Services positions are considered sensitive and require a criminal record check of successful candidates. Competitive benefits. Please state job title. Interviews are arranged and conducted after the closing date.

AN EQUAL OPPORTUNITY AFFIRMATIVE ACTION EMPLOYER

## MEMPHIS/MID-SOUTH

Welcomes you. We specialize in the placement of data processing and management consultant professionals and have done so for nearly 20 years. If you qualify for a position commanding a salary range over \$25,000, please contact us. Each inquiry receives the utmost confidentiality. Our clients pay our fees, provide you relocation assistance and offer great career opportunities.

**ROMAC**

Brinkley Plaza  
80 Monroe Avenue, Suite #420  
Memphis, TN 38103  
(901) 523-0500

## UNIVAC

Programmers, Systems Analysts, Data Base Analysts, Systems Programmers—Let us update you on the rapidly changing UNIVAC market coast to coast. To confidentially explore exciting new career opportunities, rush a resume or call Gary Repetto, CPC.

DUNNILL OF

ALBUQUERQUE, INC.

1717 Louisiana NE, Suite 218

Albuquerque, NM 87116

(505) 285-1871

Respectfully Employer Refused

## FLORIDA

Contracting or Permanent Positions

### PROG. ANALYST

- UNIX/C
- CICS/DLI
- IMS DB/DC
- IMS ADP
- IDMS
- FOCUS
- ASSEMBLER
- RPG II or III
- NATURAL/ADABASE
- BURROUGHS
- TANDEM
- DATA DICTIONARY

### OPERATIONS

- OPERATORS IBM ENVIRONMENT
- SYSTEM PIA MVS/XA, DOS/VSE, VM
- TELECOMMUNICATIONS WORKING

### SOFTWARE

- MSA
- MC CORMACK & DODGE
- HOGAN
- MILLENNIUM

Call Ginny Vaughn (305) 651-3200, or send confidential resume and salary requirements to:

**STARTED UNLIMITED, INC.**  
20295 N.W. 2nd Ave., Suite 201  
Miami, Florida 33189

## APPLICATIONS SYSTEMS COMMUNICATIONS EXPLORE WASHINGTON D.C.

MAC Exchange has immediate openings for experienced computer industry professionals. Whether your experience is in applications or systems — mainframes or micro — MAC Exchange can help. These among other specific openings exist:

- IBM VAX HP3K
- COBOL FORTRAN/ASSEMBLY

If you'd like to explore employment in the D.C. area, pick a good guide. MAC Exchange is based in D.C., has many immediate opportunities and is paid for by the companies we serve. Sorry, no entry level or operators. For more information call (703) 448-1181 during the day, (703) 448-1456 (24 hours) or mail your resume to:

**MAC Exchange**  
8500 Leesburg Pike  
Vienna, VA 22180

## APPLICATIONS ANALYST

Digi-Key Corporation is seeking an ambitious, aggressive individual with extensive exposure to assembly language or knowledge of computer hardware is desirable as is experience programming concurrent processes in a real time environment. A master's degree in electrical engineering or computer science is preferred, but motivated individuals with a bachelor's degree will be considered. Exposure to Perkin-Elmer computer systems is a real plus. A salary in the range of \$35,000 to \$50,000 depending on education and experience, three weeks of paid vacation, plus an excellent benefits package are offered for your service.

Digi-Key is a rapidly expanding mail order distributor of electronic components serving a national market since 1972. We are located in northwest Minnesota near excellent recreational opportunities including fishing, big game hunting, skiing, snowmobiling, and much more. Our town is large enough to provide a good educational system and cultural opportunities yet small enough to offer a rural lifestyle.

**DIGI-KEY CORPORATION**  
Kelle River  
781 Brooks Ave South  
Thief River Falls, MN 56791  
Phone: 800-344-6539

A.M.S. in COMPUTER SCIENCE is needed for job involving programming an experimental system that will be used to program real-time systems. Tasks include designing, writing, debugging and documenting programs. Further responsibilities to critical design proposed by other project members. Background must include at least two undergraduate level courses in PUL programming, as well as discrete algorithm structures, scientific programming, computer architecture, data structure, programming languages, including assembler language. Must also have at least one graduate level course in each of the following areas: Digital and analog systems, and advanced topics in computer science, including computer architecture. The above must be supported by a transcript. Working hours: 8:00 A.M. to 4:45 P.M. Monday - Friday. Salary \$2781.60 per month. Applicants should submit a copy of resume and transcript to Michigan Employment Security Commission, 7310 Woodward Ave., Room 415, Detroit, Michigan. Reference #42986.

An Equal Opportunity Employer-Paid Advertisement

### CAD/CAM

Software Engineering Engineer:

Will apply industrial engineering and computer control of manufacturing techniques to analyze necessary requirements of the users manufacturing organizations to set up a systematic procedural and method for CAD/CAM software development. Will design, maintain and develop necessary CAD/CAM systems using computer graphics and two and three dimension modeling techniques using C language in a UNIX operating system. Requires MS degree in Computer Science or Industrial Engineering. If MS in Computer Science education must include two years of undergraduate studies in Industrial Engineering. Education must include one course in each of the following: Computer Graphics, Geometric Modeling, Computer Control of Manufacturing System and Software or Information Process Engineering. Hours: 8:30 am to 4:40 pm per week at \$27,000 per year salary. Please send resume to Michigan Employment Security Commission, 7310 Woodward Ave., Room 415, Detroit, Michigan 48202. Reference # 41486. Employer paid ad.

## TENNESSEE

### SR. SYSTEMS ANALYST

Rapidly expanding shop seeks project leader type with DEC VAX & COBOL background. Claims or insurance applications required.

Upper \$40's.

### SYSTEMS ANALYST

Degree and IBM OS/VS/VS experience required. Progressive experience includes strong COBOL and IDMS. Mtg. applications preferred.

Upper \$30's.

### PROGRAMMER ANALYST

Aggressive analyst with heavy on-line, development skills needed. Must be proficient in COBOL, OS JCL and IMS DB/DC.

Low \$30's.

**ROBERT HALF  
OF NASHVILLE**

1101 Kermit Dr., Ste. 407  
Nashville, TN 37217  
(615) 361-4900

## IMMEDIATE OPENINGS

exist Nationally for  
Programmer/  
Analysts

Three years experience in IBM IMS DB/DC and COBOL required. A degree a plus.

Excellent company paid benefits. Please send your resume to Jack Goodyear, CW-7, P.O. Box 736, Idaho Falls, ID 83402. Equal Opportunity Employer

## ENERGY INCORPORATED



## S/38 PROGRAMMER/ANALYST

Confidentially Compare your job with career opportunities currently available in the Southeast. No commitment required. All costs paid by hiring companies including interview expenses, fees, and relocation. If you are a talented S/38 or S/36 data processing professional earning between \$18,000 and \$35,000, you can advance your career by joining today.

CALL: **JIM LEA or LISA HALL**  
IBM S/38 Specialist  
(919) 584-5591 days  
(919) 228-7605 evenings  
or SEND: Any type of resume, updated to: **PERSONNEL PLACEMENT, INC.**  
P.O. BOX 1815  
BURLINGTON, N.C. 27216-1815  
21 Opportunities Now Available in N.C., GA., NY, VA, SC, OH, D.C., FL.

## FIRST AMERICAN CORPORATION

First American Corporation, a \$5 billion multi-bank holding company based in Nashville, TN is seeking the following:

**Systems Analysts** - Position requires a minimum of 2 years experience with UCCBL's super micro main processing system in an IBM MVS environment. Heavy assembler knowledge also required.

**Senior Programmer** - Position requires a minimum of 3 years experience with IBM assembler language in an MVS environment, and 1 year experience in CICS MACRO assembler. Experience with database systems helpful.

Please send resume and salary history in confidence to:

**C.A.P. First American Corporation**  
First American Center  
Nashville, TN 37237-3801

**Systems Analyst/Project Manager:** 40 hrs/wk; 8:30 am - 5:30 pm; \$33,000/yr. If overtime needed overtime pays 1 1/2 hr. Job requires a BS in Computer Science & 4 yrs experience as a Systems Analyst. Job also reqs 1) exp must include 4 yrs exp working w/online systems 2) exp must include 4 yrs exp using database management systems 3) 2 yrs exp using Honeywell mainframe & 4) 1 yr exp using IBM mainframe. Reqrs. 1) 4) may be met simultaneously in same 4 yr period. Job duties: design, analyze & develop various computer software systems to meet user needs & reqs. Analyze cost, time, equipment & personnel needs to establish project goals. Determine hardware configurations for the implementation of new automated systems. Specify in detail logical & mathematical operations to be performed by various equipment units. Design database structure. Supervise programming systems. Instruct & support users in use of newly developed systems. Qualified applicants should send resume & request for info to: 7310 Woodward Ave. Rm 415, Detroit, MI 48202. Ref # 43986. Employer paid ad.

## INFORMATION SYSTEMS ADMINISTRATOR

The City of Warwick is accepting applications for the position of Information Systems Administrator. This individual reports to the Director of Finance and is responsible for coordinating the activities between user groups and the Management Information Service Division. Knowledge and understanding of COBOL and Assembler required. Applicants must have good communication skills and training and experience in systems analysis with special emphasis in project management, planning, security, management reporting and management and supervisory techniques. Applicants should be college graduates with concentration in computer science supplemented by extensive experience in a management level information systems capacity, or any equivalent combinations of education and experience. Salary range \$38,000 to \$45,000. Submit applications to:

Division of Personnel  
**City of Warwick**  
3275 Post Road  
Warwick, RI 02886  
Mayor Francis X. Flaherty

Equal Opportunity/  
Affirmative Action Employer

Project Manager to design, develop and maintain extensive data base and telecommunication system on Prime 50 series computers located in five states, each with different computer systems. Provide technical support to upgrade/improve computer operating system. Participate in evaluation of hardware, communication devices and software packages. Train center managers in utilization of hardware and software systems. Full-time position \$40,000.00 per year. Require Master's degree in computer science and three years experience in job offered or as programmer or programmer/analyst. Experience must be in the area of data base management systems, telecommunication, and network. Require knowledge of minimum of two internal operating systems, i.e., Primos and Unix. Require the following programming languages: FORTRAN & PL/I. Apply at Oklahoma State Employment Service, 2120 S. Broadway, Edmond, OK 73034. Job Order #090786. Ad paid by equal opportunity employer.

**Programming Analyst, 40 hrs/wk, 8-5, \$26,800/yr.** Write, analyze & develop on-line computerized accounting systems; maintain existing on-line batch & real time systems; inventory, medical billing, office scheduling, payroll, general ledger, sales & accounts receivable, write menu for software systems; applied structured BASIC, PASCAL & RPG II to code, test, analyze & develop programs. Min Req: Bachelor in Business Administration or Comp. Sci. 1 yr exp job offered or as Programmer or Programmer Trainee; 21 credit hrs computer sci; 12 credit hrs accounting or 8 mos in coding/debugging computerized accounting systems; academic or work background in software configuration management; 6 mos exp job in structured BASIC, PASCAL & RPG II programming & in micro-processors & minicomputer. Contact: Arkansas Employment Security Division, P.O. Box 188, North Plaza Shopping Center, Conway, Ark., 72032. Phone # (501) 327-6572. Job Order #260314. Ad paid for by an Equal Employment Opportunity Employer.

## CICS SYSTEM PROGRAMMER

Sacramento County is accepting applications for Computer Software Specialist to support CICS. Work involves planning, installation, maintenance, and performance tuning several CICS systems. ADABASE and VM/CMS experience preferred but not required. Apply at Personnel Management, 700 H Street, Ground Level, (916) 440-5593. Salary: \$32,926/yr - \$40,019.



## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

## POSITION ANNOUNCEMENTS

# Programming Professionals

**For a bright new career perspective, take a closer look at Fairchild Weston.**

Fairchild Weston is a frontrunner in highly advanced electronics and electro-optical systems, ATE and armament systems for the DoD.

To meet the needs of our growing company, our MIS Department is expanding, offering excellent career opportunities and challenges for progressive programmers.

## Systems Programmer

Requires a BSCS and a minimum of five years experience. Position will be responsible for upgrading the existing 4361 VM/CMS, DOS/VSE Environment with performance measurement software, (JARS, OMEGA-MON, EASYTRIEVE, etc.). Candidate will be responsible to migrate, recommend and develop system software to an additional 4361-14 MVS/XA environment in 1987 utilizing IDMS. DoD and manufacturing background is desirable.

## CICS Programmer Analyst

Requires a BSCS and a minimum of two years of accounting systems development and CICS COBOL experience. Position will be responsible to develop new financial and costing applications in a 4361VM/CMS, DOS/VSE environment. Candidate should be willing to travel, and be willing to undergo training in IDMS and related software.

Explore your fine career prospects with Fairchild. We offer excellent salaries, extensive benefit programs and top-caliber professional colleagues. To find out more, please send resume and salary history, indicating position of interest to: R. Magnus, Professional Staffing, Dept. 56S, Fairchild Weston Systems, Inc., 300 Robbins Lane, Syosset, NY 11791.



**FAIRCHILD WESTON SYSTEMS INC.**  
Excellence in Defense Systems Technology... Worldwide

FAIRCHILD SYSTEMS

Equal Opportunity Employer, M/F  
U.S. Citizenship Required

## Data Administrators

# DARE TO BE DIFFERENT.

**T**he future, we believe, belongs to people with the courage to create it.

That's why, at The Travelers, we had the imagination to build an advanced data resource management group. To manage information, not just space.

Our corporate strategy: integrate existing and emerging technologies into a complex, well-managed subject data base environment.

Currently, we're using multiple DBMSs (IMS, DB2, ORACLE, FOCUS), integrated management resources (IBM DD, Datamanager), and automated tool-boxes for data base designers, data analysts, and data base support staff. We're also using a sophisticated development life cycle including enterprise modeling.

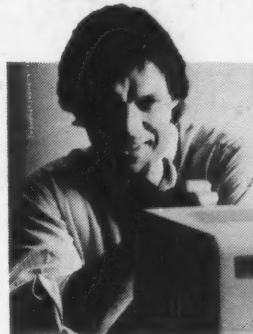
In short, The Travelers is implementing the best of today's technology to support the business environment of tomorrow.

**DATA ANALYSTS, DATA DICTIONARY, & DATA BASE SUPPORT PROFESSIONALS.**

Find out about the unique positions available at a variety of levels in our Hartford, Connecticut home office.

All provide a broad range of exposure, but the concentration of skills and amount of experience required varies. Do you have data base design or performance and tuning skills with IMS, CICS, DB2 or FOCUS? Any additional exposure to VSAM, UCC, TSO, DLI, MVS, COBOL, or BAL?

How about data modeling expertise with top-down or bottom-up techniques?



Data dictionary strengths and exposure to IBM DD or Datamanager? Can you analyze the impact of new hardware and software systems technology?

No matter what your role, you should be able to work equally well as part of a team or on your own. We're looking for the rare combination of conceptual thinker and dynamic doer. The kind of person who can create new approaches

and carry them out.

Even if you don't have a lot of experience, but you *do* have a strong desire to learn, we have a great training program.

Whether experienced or an ambitious self-starter, nowhere will you find greater challenge, exposure and career growth potential. Plus the kind of competitive salary and complete benefits you'd expect from a \$43 billion financial services company.

So, if you really want to make a difference, join a company that demands the best you have to offer. Send a current resume (or just grab a pencil and update an old one) including salary requirements to: Dorothy Smith, The Travelers Companies, 30-CR, Mailstop CW714, One Tower Square, Hartford, CT 06183.

Data Processing  
For Dedicated People.

**TheTravelers**

The Travelers Companies, Hartford, Connecticut 06183.

An Equal Opportunity Employer.

## Programmer Analysts

TRW Information Services Division is a major marketer of leading edge business and consumer credit information software products and services. The fact that we process 2,000,000 inquiries a year and operate one of the world's most sophisticated on-line computer operations — and the largest IMS database in the country — tells you something about the size of our success.

We are playing a major role in the future of TRW. Information services is the fastest growing business sector in the country — and we forecast our growth to take us over the \$1 billion mark in the near future.

To analyze, design and code the new, state-of-the-art products we're developing, you'll be utilizing structured techniques and software development methodologies. To qualify, you'll need a minimum of 2 years programming experience using IBM ASSEMBLER in a commercial applications environment and demonstrated skills in VSAM, TSO/SPF, COBOL, and OS/JCL in an IBM OS/MVS environment.

TRW ISD offers excellent growth potential in a progressive work atmosphere with competitive salary and benefits to match. Tomorrow is taking shape at a company called TRW, so send your resume today:

TRW ISD  
Professional Employment  
DEPT. CW714  
Suite 300  
505 City Parkway W.  
Orange, CA 92668

**TRW**

An equal opportunity employer

## SYSTEMS PROGRAMMERS PROGRAMMERS & ANALYSTS DATABASE ANALYSTS

Do you look forward to Fridays or Mondays? If your answer is Fridays, call to hear about these opportunities guaranteed to make you look forward to the challenge of Mondays. (Southeastern & Midwestern locations)

**SYSTEMS PROGRAMMERS**  
MVS, CICS, or VTAM.....To \$49K  
**SR. SYSTEMS PROGRAMMERS**  
IMS.....To \$49K  
**SYSTEMS PROGRAMMER**  
UNIX.....To \$50K  
**DATABASE ANALYSTS**  
IMS or DB-2.....To \$50K  
**SR. DATABASE ANALYST**  
ADABAS/NATURAL/CICS.....To \$49K  
**PROGRAMMER ANALYSTS**  
DB-2, IMS or some DBMS.....To \$50K  
**SYSTEMS ANALYSTS**  
Sales/Marketing Applications.....To \$45K

### CALL or WRITE

BRENDA CAREY, CPC  
(919) 222-0231

AMOS & ASSOCIATES  
633-B Chapel Hill Rd.  
Burlington, NC 27215

## SYSTEM 38 PROFESSIONALS

Expanding S/38 data center in Central N.Y. seeks several RPG III programmer analysts. Req. min. 1 yr. exp. w/RPG III. Pref. BA/BS degree w/industry bkgrd. in health care, mfg. or distribution. Excellent growth opportunity. To \$34,000.

**ROBERT HALF OF BUFFALO, INC.**  
420 Main Street  
1310 Liberty Building  
Buffalo, NY 14202  
(716) 842-0801  
Personnel Agency

## THE SYSTEMS CHALLENGE...

It has taken an ongoing commitment to technology to support Humana's integrated healthcare system. The demand for the systems to efficiently control our operations is tremendous. We're in the forefront of healthcare today because we consistently incorporate the very latest, most versatile technology...

## FOR A WORLDWIDE HEALTHCARE NETWORK

IBM 3090/3084, operating under MVS/XA and a Database Management System comprising IDMS/R release 10.0 reflect our technology-driven environment. Plus we're currently developing systems to support our health insurance division which has grown from zero to 650,000 members in the past two years.

## PROGRAMMERS • SYSTEMS ANALYSTS • PROGRAMMER ANALYSTS • PROJECT LEADERS

Our need is for individuals with experience ranging from 3 yrs. and up. Our opportunities for advancement are almost limitless, as the best in software talent move into both management and technical fields.

Our assurance is that you will find challenge and growth in a corporation committed to technology. Now is the time to find out more about your future with Humana. Please send your resume with salary history to: Eugene Ford, Jr., Humana Inc., The Humana Building, 500 West Main, Louisville, KY 40201-1438 or call 502/580-3414. EOE/M/F.

**Humana**



# "Computerworld's audience delivers the proven professionals that we look for."



Marc Blessing  
Director  
CompuSearch  
Cleveland, Ohio

A division of Management Recruiters International with 172 offices in the U.S., CompuSearch markets itself as the nation's largest recruitment agency devoted exclusively to MIS/DP placement. But it was not always that way, according to Marc Blessing, Director of CompuSearch. CompuSearch needed to gain industry awareness. *"Three years ago the general public and most of the DP industry had never heard of CompuSearch. Prospective clients would often say, 'who?' when our account executives would call,"* says Marc. *"We needed national recognition and we needed a publication that would allow us to zero in on our target audience."*

So CompuSearch started advertising in Computerworld. And it worked.

*"It worked because of Computerworld's audience,"* he explains. *"We're getting people with diverse backgrounds — from dedicated professionals with 2-3 years of programming experience to top MIS/DP management."*

*"Computerworld's audience delivers the proven professionals that we look for,"* Marc reports.

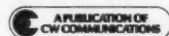
*"Because of the new contacts that Computerworld produced on both the client and candidate sides, we decided to increase — actually double — our advertising in 1986,"* he adds. *"We've considered other publications, but we know that our dollars stretch farther with Computerworld. It allows us to hit our target audience,"* concludes Marc.

Computerworld. We're helping employers and top professionals get together in the computer community. Every week. Just ask Marc.

For all the facts, call Al DeMille, National Sales Manager, at (617) 879-0700.

## COMPUTERWORLD

375 Cochituate Road, Box 9171,  
Framingham, MA 01701-9171/(617) 879-0700





## Computerworld Sales Offices

Publisher/Vice-President/Dan E. Fagan

VP/Sales/Edward P. Marecki  
Manager/Marketing & Sales Operations/Kathy Doyle  
Computerworld, 375 Cochituate Road, Box 9171,  
Framingham, MA 01701-9171  
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700  
Northern Regional Manager/Ronald Masello  
District Managers/Jim McClure, Michael F. Kelleher  
David Peterson, Bill Colgan  
Account Manager/Shem Driscoll  
Sales Assistant/Alice Longley  
Computerworld, 375 Cochituate Road, Box 9171,  
Framingham, MA 01701-9171

CHICAGO SALES OFFICE (312) 827-4433  
Midwest Regional Manager/Russ Gerchels  
District Manager/Steven McPherson  
Sales Assistant/Jean F. Broderick  
Computerworld, 2600 South River Road, Suite 304,  
Des Plaines, IL 60018

NEW YORK SALES OFFICE (212) 967-1350  
Eastern Regional Director/Michael J. Masters  
Senior District Manager/Doug Cheney  
District Managers/Jean Daly, Fred Lo Sapio, Frank Genovese  
Account Manager/Gale M. Peterno  
Sales Assistants/Mary Burke, Sue Larson  
Computerworld, Forum Plaza I,  
140 Route 17 North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1230  
District Manager/Bernie Hockewender, Carolyn Knox  
Western Regional Director/William J. Healey  
Computerworld, 18004 Sky Park Circle, Suite 255,  
Irvine, CA 92714

SAN FRANCISCO SALES OFFICE (415) 421-7330  
Western Regional Director/William J. Healey  
Senior District Manager/Barry Malone  
District Managers/Ernie Chamberlain, Mark V. Glasner  
Account Manager/Diane Fuller  
Account Manager/Classified/Rebecca Boothman  
Computerworld, 300 Broadway, Suite 20,  
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0758  
District Manager/Jeffrey Melnick  
Eastern Regional Director/Michael J. Masters  
Sales Assistant/Melissa Christie  
Computerworld, 1400 Lake Hearn Drive, Suite 330,  
Atlanta, GA 30319

DALLAS SALES OFFICE (214) 991-8366  
District Manager/Mark V. Glasner  
Western Regional Director/William J. Healey  
Computerworld, 300 Broadway, Suite 20,  
San Francisco, CA 94133

CLASSIFIED ADVERTISING (617) 879-0700  
National Recruitment Sales Manager/Al DeMille  
Recruitment Account Executives/Geoff Dodge,  
Derek E. Hultzy  
Computerworld, 375 Cochituate Road, Box 9171,  
Framingham, MA 01701-9171  
CW INTERNATIONAL MARKETING SERVICES  
Managing Director/Frank Chubb  
Computerworld, 375 Cochituate Road, Box 9171,  
Framingham, MA 01701-9171  
(617) 879-0700

Computerworld, 1060 Marsh Road  
Menlo Park, CA 94025  
(415) 328-8054

## CW Communications/Inc.

Board Chairman President Executive Vice-President  
Patrick J. McGovern W. Walter Boyd Lee Vidmer

Publisher/Vice-President, Donald E. Fagan, Senior VP-Communication Services, Jack Edmonston,  
VP-Sales, Edward P. Marecki, Group VP-Circulation, Margaret Phelan, VP-Finance, William P. Murphy,  
Computerworld Headquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171  
Phone: (617) 879-0700, Telex: 95-1153.

SALES Vice President, Edward P. Marecki, Manager/Marketing & Sales Operations, Kathy  
Doyle, National Recruitment Sales Manager, Al DeMille, Display Advertising Manager,  
Anne Hadley, Senior Coordinator, Carolyn Medeiros, Display Advertising, Maureen  
Carter, George W. Griffin, Joy Forman, Classified Operations Manager, Cynthia Delany,  
Senior Vice-President, Jack Edmonston, Director Research, Kathryn Dinneen, Sales  
Promotion Director, Liz Johnson.

PRODUCTION Production Director, Peter Holm, Production Manager, Marlene Stibal, Paste-Up  
Manager, Patricia Gaudette, Typesetting Manager, Carol Polack, Art Director, Tom  
Monahan.

CIRCULATION Group Vice-President, Margaret Phelan, Circulation Director, Nancy L. Merritt,  
Corporate Fulfillment Director, Maureen Burke.

CONFERENCE MGT. GROUP President, William R. Leitch.

MIS Corporate Director MIS, Jeff Corvoso.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb  
Rd., Ann Arbor, Mich. 48106.  
Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

Foreign Editorial/  
Sales Offices

Argentina: Ruben Argento, Computerworld Argentina,  
Av. Belgrano 406-Piso 9, CP 1092 Buenos  
Aires, Phone: 34-5583/5584. Telex: 22644.

Asia: Euan Barty, Asia Computerworld Communications Ltd.,  
701-4 Kam Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong. Phone: (05)  
8L63238. Telex: 72827 (COMWR HK)

Australia: Allen Power, Computerworld Pty. Ltd.,  
37-43 Alexander Street, Crows Nest, NSW 2065.  
Phone: (02) 4395133. Telex: AA74752 COM-  
WOR.

Austria: Dr. Manfred Weiss, CW Publikationen,  
Verlagsgesellschaft m.b.H., Josefstaedter Strasse  
74, A-1080 Wien, Austria. Telex: 115 542 (sch/)  
a).

Brazil: Eric Hipeau, Computerworld do Brazil,  
Rua Pedroso de Moraes 1553, 05419 Sao Paulo,  
SP Brazil. Phone: 814-9658-212-8750. Telex: 11  
32017 (WORD).

Denmark: Preben Engell, Computerworld/  
Danmark A/S, Torvegade 52, 1400 Copenhagen  
K, Denmark. Phone: (01) 955 695. Telex: 31566.

France: Axel LeBlais, Computerworld Communications  
S.A., 185 Avenue Charles De Gaulle,  
92200 Neuilly Sur Seine, France. Phone: 747  
1272. Telex: 613234 F.

Hungary: Dezzo Futaz, SZT Computerworld,  
P.O. Box 386, Budapest, 1536, Hungary.

Italy: Daniele Comboni, Computer Publishing  
Group S.R.L., Viale Restelli 5, 20124 Milano.  
Phone: (2) 688 9773. Telex: 333436 (GEJIT).

Japan: Mr. Shuji Mizuguchi, Computerworld Japan,  
7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104.  
Phone: (03) 551-3882. Telex: 252-4217 (Compu-  
terworld Japan only).

Steven Yamada, Tokyo Representative Corp.,  
Sanshin Kogyo Bldg., 2-10 Kando Jimbocho 3F,  
Chiyoda-ku, Tokyo 101, Japan. Phone: 230-4117.  
Telex: J26860 (reps for all CWCI publications except  
Computerworld Japan).

Mexico: Henry Morales, Computerworld Mexico  
S.A. de C.V., Oaxaca 21-2, Mexico City 7 D.F. Co-  
lonia Roma, 06700 Mexico. Phone: (05) 514-  
4218. Telex: 177 1300 (ACHAME).

The Netherlands: Wout Berends, CW Commu-  
nications B.V., van Eeghenstraat 84, 1071 GK

Amsterdam, The Netherlands. Phone: (020) 64  
6651. Telex: 18242 (CWCOM NL).

Norway: Mr. Morton Hansen, CW Norge A/S,  
Hovinveien 43, P.O. Box 2862, Toyen, 0608 Oslo  
6, Norway. Phone: (20) 64 77 25. Telex: 76476 9  
(CW NOR N).

People's Republic of China: Chen Mingjun,  
China Computerworld, 74 Lu Gu Gun Road, P.O.  
Box 750, Beijing 10039, People's Republic of Chi-  
na. Phone: (47) 814 6174. Telex: 222214 (CCW  
CN).

Spain: Neil Kelley, Computerworld/Espana,  
Barquillo 21-3 izda, Madrid-4, Spain. Phone: 231  
23 85; 231 23 86; 231 23 88. Telex: 47894 (CW  
E).

Sweden: CW Communications AB, Soder  
Hamnagen 22, S-115 41 Stockholm, Sweden.  
Phone: 46 8 67 91 80. Telex: 14904 9 (NO-  
VACW).

Switzerland: Gebhard Osterwalder, CW Publika-  
tionen AG, Witkonstrasse no. 15, CH-8032 Zu-  
rich, Switzerland. Phone: (01) 55 10 77. Telex:  
816710.

Taiwan: Grace Tang, ACE Media Agency Ltd.,  
Room 503, 1, Fu Hsin S. Road, Sec. 1, Taipei,  
10587, Taiwan, R.O.C. Phone: 751 3636. Telex:  
14142 (ACE GROUP). (Representative for all CWCI  
publications).

United Kingdom: Martin Durham, CW Commu-  
nications Ltd., 99 Grays Inn Rd., London, WC1  
8UT, United Kingdom. Phone: (01) 831-9252. Tel-  
ex: 262346.

Euan Rose, Bill Dunlop, Barbara Levy, Christine  
Taylor, Beere Hobson Assoc., 345 Goswell Rd., Is-  
lington, London EC1, United Kingdom. Phone: (01)  
278 3415. Telex: 311951. (Representatives for  
CWCI publications).

Venezuela: Kalman von Vajna Nagy, CW Co-  
municaciones, C.R.L. Torre Maracabo, Piso 10,  
Oficina H, Av. Libertador, Caracas, Venezuela.  
Phone: 72-76-30.

West Germany: Eckhard Utpadel, CW Publika-  
tionen GMBH, Friedrichstrasse 31, 8000 Mun-  
chen 40, West Germany. Phone: (089) 38172-0.  
Telex: 5215350.

## Advertisers Index

Adacom	103
Aluminum Case Company	13
Anderson Jacobson	84
Applied Management, Inc.	22
Ashton-Tate	10
ASK Computer Systems	85
AST Research	30-31
AT&T Information Systems	68-69, 90
BASF	108
Brookvale Associates	13
Businessland	73
Cambridge Systems	26
Chicago Soft	14
Cincom Systems	21
Codex Corp.	46, 52, 71
Computer Corporation of America	5
Concord Data Systems	37
CW Australia	84
CW Circulation	72
CW DEC Extral	107
CW Italy	103
CW Market Brief	86
CW NASA	83
CW Recruitment Testimonial	120, 130
CW Testimonial	110
Data General Corp.	63
Dataserv	75
Datasouth Computer	62
Datasphere	13
Dataware	39
Decision Data	98-99
Diconix	94-95
Duquesne Systems	23
EMC Corporation	93
Exide Electronics	135
Falco Data Products	47
Fibronics	12
Hayes Microcomputer	102
Hughes Aircraft	22
IBM	50
ICCP	12
Irwin Magnetics	56-57
ITT Information Systems	55
JDS	14
KMW Systems	76
Local Data	109

Lotus Development Corp.	45
McCormack & Dodge	32
Micro Data Base Systems, Inc.	106
Micro Focus	46
MicroFrame	54
Mike Murach & Assoc.	9
Mitrol Inc.	19
Morino Associates	101
MSA	136
National Expositions Co., Inc.	104
NCR Corporation	34-35
NEC	74-75
North Ridge Software	15
Northern Telecom	80-81
Okidata	105
Online People, Inc.	20
On Line Software International	96-97
Oracle Corp.	11, 27
Printronic	64, 65
Quimax	82
Qume	36
Realia Inc.	78
Relational Technology	40
Renex	53
SAS Institute	24-25, 33
Siecor Corporation	88-89
Signal Technology	66
Software International	29
Span Software	92
SPSS	42
Sterling Software	28
Stern Consulting	38
Syncsort	3, 18
Tandem	87
Tangram Systems	38-39
Tone Software	13
Topaz	44
TRW	43
TSI International	134
Tymnet	70
Ungermann Bass	48-49
VM Software	7
Westinghouse	100
Word Perfect	79
Wyse Technology	58

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.



## COMPUTER INDUSTRY

## STC creditors get 80% equity

### Deal settles debts owed before Chapter 11 filing

LOUISVILLE, Colo. — Storage Technology Corp. (STC) took the first step out from under the veil of bankruptcy last week, announcing an agreement in principle with its creditors' committee that would give creditors 80% equity in STC.

The agreement was unanimously approved by STC's board of directors and effectively settles all of the company's debts before it filed for protection under Chapter 11 of the Federal Bankruptcy Code 21 months ago.

STC now plans to file a reorganization plan in U.S. Bankruptcy Court in

Denver. The company said it hopes to have the plan approved by year's end, in line with STC Chairman Ryal Poppa's earlier projections of emerging from bankruptcy (CW, May 26).

The deal appears to be a compromise over earlier proposals presented to the creditors' committee. In May, Poppa said the committee was considering a proposal to give creditors \$100 million in cash and \$300 million in eight- to 12-year notes, with the balance in equity.

Under the terms of the agreement announced last week, creditors will receive \$140 million in cash, \$285 million in 10-year notes with a 13.25% annual yield and 80% of STC's postbankruptcy common stock.

—Maura McEnaney

## Wang to slash work force

From page 134

Devin said the job cuts will occur in manufacturing, administrative and support positions at most of Wang's U.S. facilities. Positions in sales, marketing, and software and hardware support will not be affected. Devin said the company hopes to increase employment in those areas by roughly 200 people after the reduction of 1,600 is completed.

Wang will encourage employees age 45 and older with five or more years' experience to retire with at least three months' salary and other benefits. In the areas targeted for reduction, other less senior employees will be offered similar incentives. To encourage a fast reduction, Wang is offering an extra four weeks' salary to workers leaving by the end of this week and an extra two weeks' pay for those leaving by Aug. 1.

"Every company has normal attrition on a monthly basis, and we're trying to speed that up," Devin said. "The employees have been very sup-

portive so far and I am sure we will achieve our goals."

"They want to avoid the mistakes of a year ago, such as the doubt and uncertainty among employees and the demoralization that set in," one Wang worker said, contrasting last week's announcement with the 1985 layoffs. Devin said Wang studied the work force reduction methods of industry leaders that do not lay off workers, such as IBM, Digital Equipment Corp. and Hewlett-Packard Co.

Wang's financial struggles result from its inability to translate its word processing prestige into sales of its current product line, according to analyst George Colony of Cambridge, Mass.-based Forrester Research, Inc. Colony said Forrester's April survey of Fortune 1,000 users rated Wang "on a par with DEC and AT&T" and trailing only IBM in quality and customer satisfaction, but that has not been reflected in Wang's bottom line.

"Wang word processing is still the industry standard, but the business is evaporating," Colony said. "If Wang can't compete in office automation and the mid range, the growth curve will stop. It's a marketing problem. There's no clear Wang identity anymore."

## AST reduces staff by 7%

From page 134

65 jobs were cut for better productivity, Ashbrook said.

"This is a planned business move, not a reaction to the market," he said. AST employs more than 900 people in its Southern California research and development facilities and five international manufacturing and sales sites.

The revenue of the microcomputer add-on board vendor has declined steadily from \$43.6 million to \$41 million in the last three quarters. Although still well ahead of results recorded last year, net income fell sequentially from \$8.5 million to \$6.4 million in the third quarter.

The figures are attributed, both by AST and financial analysts, to a flat personal computer market and tight profit margins. Fourth-quarter 1986 results are not expected for several weeks, but analysts say they expect

the downward trend to continue.

Analyst Jon Gruber of Montgomery Securities in San Francisco called the job cut "a very positive move on AST's part" and an appropriate reaction to lower sales volume. He predicted AST revenue will drop to \$38 million in the first fiscal quarter of 1987 but added that desktop publishing ventures could pick up sales in the second quarter.

Bret Maxwell of First Analysis Group in Chicago blames IBM's clone-fighting price cuts. "AST must feel it needs to trim to meet that," he said.

AST's products that will be announced in the next few months include a scanner input system, a low-end laser printer and some connectivity products, which will expand AST's role in the desktop publishing market.

Connectivity tools in the works will allow both micros and terminals to share a laser printer, according to Ray Jeter, an AST technical sales instructor. Coaxial connections will be provided for direct IBM 3270 communications and twinaxial connections for IBM's System/36 or 38, Jeter said.

## Reasons for a stock buyback may temper its price benefits



### ACTIVE ISSUES

Kathy Porteus

**H**ow should investors interpret stock buyback programs in technology companies?

A stock buyback occurs when a company purchases up to a preannounced number of its outstanding common shares. Companies that recently repurchased stock include Honeywell, Inc. (HON — 76%), IBM (IBM — 145%), NCR Corp. (NCR — 51%), Lotus Development Corp. (LOTS — 35%) and Quantum Corp. (QNTM — 17%).

Stock buybacks attract attention because, historically, they have a positive effect on a stock's price. For example, on the day IBM announced it would repurchase up to 10 million, or nearly 2% of its outstanding shares, its stock price rose more than four points.

According to Michael R. Weisberg, director of technology research for Robertson, Colman & Stephens, several studies show that one year after a buyback program, the stock's price appreciation is "very favorable" relative to that of the overall market.

Basically, there are two reasons for this positive reaction. First, buying back stock reduces a company's number of outstanding shares, thereby increasing the earnings each remaining share receives. A company with prospects for higher earnings per share usually piques investor interest.

Second, a company often buys back shares when management considers current prices a bargain based on historic valuation standards or on future business expectations. According to Michael Murphy, editor of "The California Technology Stock Letter," investors take notice of buybacks for the same reasons they watch insider buying.

Although investors initially bene-

*Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.*

fit, stock buybacks can raise longer term questions. Repurchasing stock to take advantage of cheap prices, Weisberg suggests, may be balanced by "changing secular fundamentals that could keep the valuation of technology stocks — relative to that of other emerging growth companies — lower than they have been."

John LeFrere, managing partner with Delta Capital Management, says buybacks are a sign of a mature industry. Normally, a growth company will invest in its future by pursuing new business opportunities or devoting more resources to research and development.

"A company buying back stock," LeFrere says, "is effectively admitting that it won't be growing as fast." The increased return on equity that results from a buyback is not a correct reason investors should pay premiums to the market multiple, LeFrere contends.

Murphy disagrees: "If a company is able to raise money cheaply through debt, turn around and use that money to buy back some stock to earn a higher rate of return, then that is good for shareholders."

Before determining what's good and what isn't, shareholders should carefully evaluate the reasons behind a stock buyback program. According to LeFrere, AMP, Inc. (AMP — 37%) has a consistent buyback policy for its employee stock plan, so its buyback does not indicate slower growth expectations. But small capitalization companies, such as Quantum, generally warrant further examination, LeFrere says.

Another example, NCR, has had excess cash, and buying back stock is one way to invest it. This benefits NCR shareholders and provides lower taxes on such gains than would be the case with increased dividends.

IBM has regularly repurchased stock for its employees and probably bought back twice the usual number of shares this year because management believes the stock is undervalued. Companies also repurchase stock as an antitakeover measure or as a means of pumping the stock to obtain a better sale price.

Investors must not only evaluate individual stock buyback programs, but also recognize that positive market reaction to a buyback is accompanied by longer term issues.

## DCA boasts 90% earnings increase

By James A. Martin

ALPHARETTA, Ga. — Digital Communications Associates, Inc. (DCA) last week reported a 90% earnings increase for fiscal-year 1986.

DCA earned \$20.6 million, compared with \$10.8 million for fiscal 1985. Sales for the year, which ended June 30, were \$137.8 million, a 39% increase over the previous year's \$99.2 million. Earnings per share were \$1.80, compared with \$1.06.

For the fourth quarter, net income

rose to \$5.7 million, or 47 cents a share, from \$3.3 million, or 33 cents a share, a 70% increase. Sales were \$34.6 million, compared with \$31.7 million, an increase of 9%.

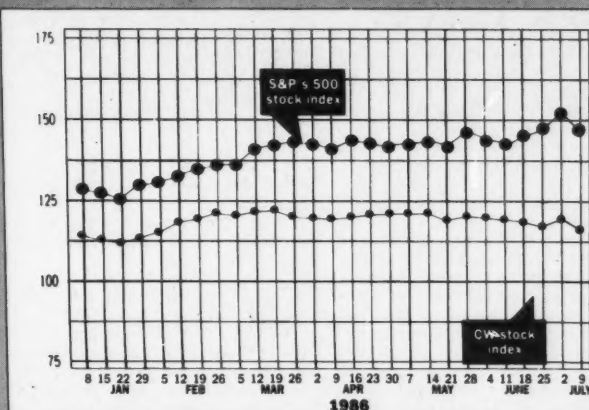
The fourth-quarter and fiscal-year results were "far better than management had implied earlier," said Andy Schopick, vice-president and senior analyst at Gartner Securities Corp. in Stamford, Conn. "DCA is an extremely well managed company, especially financially and in product positioning," Schopick said.



## COMPUTER INDUSTRY

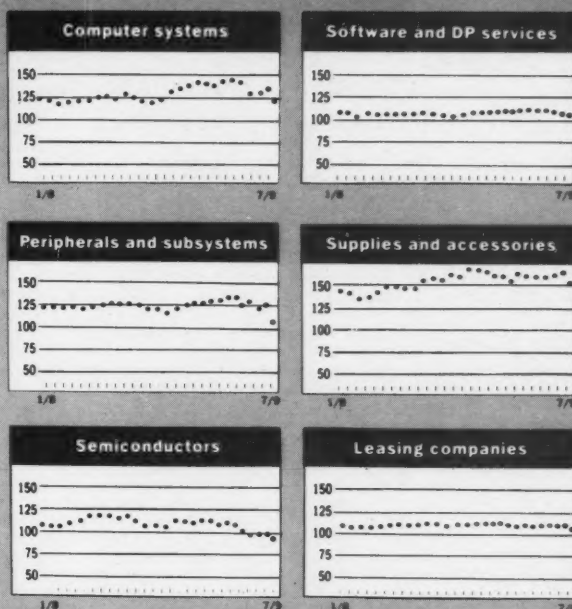
MITCHELL J. HAYES

## Computerworld stock trading index



All indexes reflect a historical base of 100 on Dec. 31, 1984, and trace stock market performance in relation to that base. The CW stock index represents the unweighted average performance of the six categories of computer industry stocks.

	7/2/86	7/9/86
Computer systems	126.7	121.7
Software and DP services	105.9	104.9
Peripherals and subsystems	124.1	104.9
Supplies and accessories	155.6	150.1
Semiconductors	93.0	85.9
Leasing companies	104.2	103.9
CW stock index	117.6	113.5
Standard and Poor's 500 stock index	151.1	148.2



## Computerworld stock trading summary

CLOSING PRICES WEDNESDAY, JULY 9, 1986

X C H		PRICE				
		52-WEEK RANGE (1)	CLOSE JULY 9 1986	WEEK NET CHANGE	WEEK PCT CHANGE	
	COMPUTER SYSTEMS					
O	ALPHA MICROSYSTEMS	5	9	5 5/8	-3/8	-6.2
O	ALLOTT COMPUTR SYST	1	19	13 1/4	-5/8	-4.3
O	ANDAR CORP	17	10	14 1/2	-1 1/2	-9.3
O	APOLIS COMPUTER INC	9	31	12 5/8	-1 3/8	-9.8
O	APPLE COMPUTER INC	34	24	34 5/8	-1 1/2	-4.1
O	AT&T	52	71	54 1/2	-2 1/2	-4.2
N	BURROUGHS CORP	14	51	70	+2 1/2	+3.7
O	COMPAQ COMPUTER CP	5	18	13 3/8	-1 1/8	-7.7
O	COMPUTER AUTOMATION	1	9	9	0	0.0
A	COMPUTER CONSOLES	5	14	9	-3/4	-7.6
O	CONTROL DATA	15	39	23 1/2	+1/2	+0.4
O	CONVERGENT TECHNO	5	13	14 1/2	+1/2	+3.4
O	CRAY RESEARCH INC	29	97	89 1/2	-7 7/8	-8.0
O	DATA GENERAL CORP	10	9	9 3/4	-1/4	-4.8
O	DEC	31	76	34	-1	-2.6
N	DIGITAL EQUIPMENT	42	91	7 1/8	-7/8	-10.0
A	ECOA INC	13	20	18 7/8	-1/8	-0.5
O	ELECTRONIC ASSOC.	13	20	18 1/2	-1/2	-2.6
N	FLOATING POINT SYST	18	42	34 1/2	-3 3/8	-8.1
N	GOLD INC	22	31	28 1/2	-1 7/8	-6.1
N	HARRIS CORP	22	36	31	-5	-13.9
N	HEWLETT-PACKARD CO	29	45	36 3/8	-7/8	-2.0
O	HONEYWELL INC	3	87	73	-14	-16.1
N	IBM	11	158	144 1/4	-5 1/4	-3.5
O	IRL SYSTEMS INC	1	4	3	-3/8	-11.1
O	ITTP CORP	57	54	3	-54	-94.7
N	M/A-COM INC	13	24	15 3/4	-1 1/2	-8.6
N	MANAGEMENT ASSIST	2	28	2	0	0.0
O	MANITEX ELECTRONIC	4	98	81 1/8	-5 3/8	-6.0
O	MENTOR GRAPHICS	13	30	15 1/8	-3	-24.2
N	MOHAWK DATA SCI	1	13	2	-1/4	-9.5
N	NBI INC	20	11	20	+9	45.0
N	NCR	22	56	52 3/8	-1/8	-0.2
N	PERKIN-ELMER	25	36	27 5/8	-5/8	-2.2
O	PRIME COMPUTER INC	27	21	17 1/2	-1 1/2	-8.3
N	SPEERY CORP	13	76	75 1/8	-3/4	-0.5
O	STRATUS COMPUTER INC	9	25	20	-5	-20.0
O	TANDEM COMPUTERS	13	34	31 3/4	-5/8	-1.7
N	TANDEM CORP	2	44	36	-2 3/4	-7.0
O	TELETYPE SYSTEMS	2	4	2 7/8	-1/8	-4.1
O	TEKCORP	24	22	24	+2	9.1
N	TEXAS INSTRUMENTS	86	141	119 7/8	+1 7/2	+0.4
A	ULTIMATE CORP	8	34	26 3/8	-1/2	-1.8
O	VECTOR GRAPHICS INC	1	1	1 1/8	0	0.0
A	WANG LABS "B"	15	29	14 5/8	-1/4	-1.6
A	WANG LABS "C"	12	19	14 1/4	-1/4	-1.4
O	WANG LABS "C"	15	29	14 1/4	-1/4	-1.4

X C H		PRICE				
		52-WEEK RANGE (1)	CLOSE JULY 9 1986	WEEK NET CHANGE	WEEK PCT CHANGE	
	<b>SOFTWARE &amp; DP SERVICES</b>					
O	ADVANCED COMP TECH	2-6	6	4 7/8	-1/2	-9.3
N	ADVANCED SYSTEMS INC	10-20	17 1/2	1/2	-1/4	-3.4
N	ADPS CORP	10	25	1/8	3/4	3.0
O	AMERICAN SOFTWARE	9-15	11 1/2	-1/2	-1/4	-11.5
N	ANACOMP INC	5-11	5 1/2	0		0.0
N	ANALYSIS & LOGIC CORP	6-14	10	5/8	5/8	10.0
O	ASHTON TATE	6-34	25 1/4	-3/8	1/8	-12.5
O	ASK COMPUTER SYSTEMS	7-25	10	-1 1/8	-1/8	-10.1
N	AT&T	10-25	14	1/4	1/4	1.4
N	AUTOMATIC DATA PROC	18-39	39	-1 3/4	-1/4	-4.4
O	COMPUTER NETWORK	5-25	22	5/8	-3/4	-3.1
N	COMPUTING ASSOC INTL	25-25	25	1/2	1/2	2.0
O	COMPUTER HORIZONS	5-13	11 3/8	-1/4	-1/4	-3.5
N	COMPUTER SYSTEMS	13-39	35 5/8	-3/4	-1/4	-9.5
N	COMPUTER & E GROUP	10-20	20	1/2	1/2	2.5
O	COMPUTER USAGE	1-3	2 1/8	0		0.0
O	COMPUTONE SYSTEMS	3-11	3	1/2	-1/2	-14.2
N	CONSERV CORP	7-13	12	-3/4	-1/2	-6.2
O	COMSHARE	7-13	12 1/2	-1/2	-3/8	-4.0
N	CULLINETH SYSTEMS	12-33	33	1/8	1/8	0.3
N	CYBER ASSOCI INC	13-27	17 1/8	-1/8	-1/8	-0.6
N	HOGAN SYSTEM INC	4-12	10 5/8	-1/2	-1/4	-4.4
N	GENERAL ELECTRIC CO	4-22	76 5/8	-4/8	5/8	0.6
N	GENL MOTORS & EDG	38-55	55	-1 1/4	-1/4	-2.7
N	GTE CORP	3-35	53 1/8	-2 1/4	-1/4	-4.6
N	INFORMATION SYSTEMS	14-24	24	1/4	1/4	1.6
O	INFOTRON SYSTEMS CP	13-24	24	1/4	1/4	1.6
O	KEANE ASSOCIATES	11-24	14	1/4	-7/8	-5.5
N	LOGICON	10-20	43 1/8	-2 1/8	-1/8	-4.8
N	LOTUS DEVELOPMENT CP	34-38	34	-2 1/2	-1/2	-7.3
O	MCI COMMUNICATIONS	7-13	9 7/8	-1/2	-1/4	-5.1
N	MGMT SCI AMERICA SYS	7-13	16	1/2	1/2	3.1
O	MATHEMATICAL APP GRP	1-8	13 5/8	5/8	-1/4	-3.5
N	MICOM SYSTEMS INC	12-35	12 1/4	-1/4	-1/2	-3.5
N	MICROCOM INTL	1-12	1	0		0.0
O	NATIONAL DATA CORP	8-25	25	18 3/8	-2 3/8	-11.4
O	ON LINE SOFTWARE INT	4-16	13	-3/4	-3/4	-5.4
N	ONLINE SYSTEMS	8-25	25	1/2	1/2	2.0
N	PLANNING RESOURCES	11-23	18 5/8	-1/2	-1/2	-2.6
O	POLICY MGMT SYSYS CP	16-35	10	9 7/8	-1 1/2	-8.0
N	PROGRESS DATA SYS	10-20	20	1/2	1/2	2.5
O	REYNOLDS & REYNOLD	30-65	31 3/4	-1	0	-3.0
N	SHARER MEDICAL SYST	13-27	16 1/2	-1 1/2	-3/8	-8.8
O	SCIENTIFIC COMPUTERS	26-38	33	-2 1/2	-1/2	-7.6
O	SOFTWARE AG	4-22	18 1/4	-1/8	-1/8	-0.4
N	URS CORP	12-22	18	1/2	-3/4	-4.4
N	UCCEL	11-23	19 1/4	-2 3/4	-1/4	-11.9
O	VM SOFTWARE	17-31	25	1/2	-2 3/8	-9.7

A C H		PRICE			
		52-WEEK RANGE (1)	CLOSE JULY 9 1986	WEEK NET CHANGE	WEEK PCT CHANGE
	PERIPHERALS & SUBSYSTEMS				
P	AM INTERNATIONAL	3- 8	6 7/8	+1/8	+1.8
A	ANDERSON JACOBSON	2- 5	2 1/8	-1/8	-5.3
O	AST RESEARCH INC	3- 7	3 1/4	-3/8	-10.0
O	AUTO-TROL TECHNOLOGY	3-13	4	-1/8	-3.0
O	AVANT-GARDE COMPUTING	3-12	3 3/8	-5/8	-15.6
O	BATES INC	6-13	6	-1/8	-1.6
O	BEHNE INT'L	1- 2	1 1/8	0	0.0
O	BELL-BERANER & NEW	20-48	42	-1 1/4	-2.9
A	CAMBER CORP	1- 3	2 1/2	-1/8	-3.8
N	CENTROSTATS DATA COM	3-11	6 5/8	+1/8	+1.5
A	CETEC CORP	6- 9	9	1/8	1.1
A	COGNOSCENT	3- 7	7 1/2	0	0.0
N	COMPIGRAPHIC CORP	20-36	19 1/2	0	0.0
O	COMPUTER TRANSCREVER	1- 4	3 3/4	-1/8	-2.3
O	COMPUTER SYSTEMS CORP	9-44	13 3/4	-3/4	-5.4
O	CONRAC CORP	12-18	15 3/4	-5/8	-3.8
A	DATAPRODUCTS CORP	11-20	14 7/8	+1/4	+1.7
O	DATA-TRONICS INC	7-10	8 1/2	-7/8	-8.8
O	DATA SWITCH CORP	4- 9	6 3/8	+3/8	+5.5
O	DATUM INC	5- 9	5 3/8	-1/4	-12.2
O	DECISION INTL CORP	10-20	11 1/8	-1 1/8	-13.9
O	ENDATA, INC	2- 8	6 3/8	-3/8	-5.5
O	EVANS & SUTHERLAND	12-27	21 1/2	-1 1/2	-6.5
O	GANDOLF TECHNOLOGIES	5-13	6 1/8	-1/8	-1.6
O	GEN'L DATA COMM INTL	8-21	21 10	-3/4	-11.3
O	HACELITE CORP	17-30	18 1/2	-1 5/8	-8.0
O	ICOT CORP	3-12	10	-7/8	-7.7
O	INFORMATION INT'L INC	10-17	16	-1/4	-1.5
O	INTECOM INC	3-11	4 5/8	-1/8	-2.2
O	MEGADATA CORP	7-14	3 5/8	0	0.0
A	MES DATA CORP	7-18	11 1/2	-1 1/2	-11.5
O	NASDAQ	12-24	24	-1 1/2	-6.3
O	NETWORK SYSTEMS CORP	11-27	12 1/8	-1 1/8	-8.4
N	NO AMERICAN PHILDS	32-47	42 3/8	-2 1/2	-5.5
N	NORTHERN TELECOM LTD	28-41	28	-3/4	-2.7
O	OMAX	1- 3	1 1/2	0	0.0
O	PRADNEY	6-18	7 3/4	-3/8	-4.7
A	PENRIL CORP	3-11	10 1/2	-1/8	-0.8
N	PLESSEY CO (ADR)	19-38	33 1/4	-3/4	-2.2
O	PRINTRONIX INC	10-18	13	-1/4	-1.5
O	QMS INC	6-16	13 1/2	-1	-7.4
O	RAMTEK CORP	9-17	7 1/2	-3/8	-6.3
N	RECOGNITION EQUIP	5-12	5 1/2	-3/8	-7.0
O	SCANSYS ASSOCIATES	28-57	56 3/4	+2 3/4	+4.9
O	SCAN-TRON CORP	9-24	20	-3 1/4	-13.9
O	SCIENTIFIC ATLANTA	10-15	10	-1/8	-1.0
O	SEAGATE TECHNOLOGY	5-13	10 7/8	-1/8	-0.9
O	STONE DATA TECHNOLOGY	1- 5	3 1/2	-3/8	-9.6
O	SYKES DISTRIBUTION	0- 2	1 1/4	-1/8	-6.7
O	TEAR INC	1- 3	2 1/8	-1/8	-3.8

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;  
L=NATIONAL; M=MIWEST; O=OVER-THE-COUNTER; S=SPLIT

A	TAB PRODUCTS CO	9	15	1/8	0	-3/4	0	-5.3
A	TANDON CORP	3	-9	6	13	0	0	-0.7
A	TEC INC	4	13	4	1/4	0	0	-0.7
N	TEKTRONIX INC	47	68	59	1/8	-7/8	-1	-1.4
N	TELEX	34	-68	55	3/4	-2 1/4	-1/4	-1.4
N	TESDATA SYSTEMS CP	1	1	0	0	0	0	-0.7
N	TRIUMPH INC	15	23	16	1	-5/8	-3	-1.4
N	TITAN CORP	4	-11	8	7/8	-1	-10	-1.1
O	VISUAL TECHNOLOGY	1	-3	1/2	0	0	0	0.0
<b>LEASING COMPANIES</b>								
N	COMDISCO INC	7	24	20	0	-2	-10	-0.9
N	CONTINENTAL INFO SYS	5	-12	10	5/8	-1 1/4	-1	-0.7
N	FRANCO GROUP INC	1	0	3	1/2	-1	-1	-0.7
N	PROGRESS AMERICAN INC	2	-6	3	7/8	+1/8	+3	-0.7
N	SELECTRIC INC	1	0	1	3/4	-1	-1	-0.7
N	U.S. LEASING	32	-48	42	0	+1/4	+1	-0.7



# COMPUTER INDUSTRY

## INSIDE

Software Research Corp.'s start-up woes have hindered the success of its multivendor connectivity software/103

A financial software consultant doubts the value of the IBM-Hogan Systems partnership/104

U.S. Sprint has debuted with splashy marketing that emphasizes fiber-optic quality/106

Storage Technology agreed in principle to give its creditors 80% equity when the company emerges from bankruptcy/132

## INSTANT ANALYSIS

*"It was sort of one of these very personal kinds of self-examinations which I am given to and have always been given to."*

— Mitchell D. Kapor on his decision to resign as chairman of Lotus Development Corp.

## Wang to slash work force

**'Voluntary separations,' early retirements planned**

By Clinton Wilder

LOWELL, Mass. — Unable to generate significant sales momentum for the past 12 months, Wang Laboratories, Inc. said last week that it will eliminate 1,600 jobs, mainly through voluntary means.

Except for the layoff of 220 employees at an Office Information System (OIS) manufacturing plant in Puerto Rico, all of the job cuts will be accomplished by early retirement incentives and a "voluntary separation" program. The reduction of the worldwide work force to 30,000 people is expected to be completed by Aug. 31, reducing annual expenses by approximately \$48 million, said Ed Devin, Wang's senior vice-president for human resources.

The announcement came some 13 months after Wang laid off 1,600 workers before posting a \$109 million loss, its worst ever, in the fourth quarter of fiscal 1985. Despite that work force reduction, the formerly high-flying office automation

pioneer has yet to record more than modest profits in subsequent quarters.

Plagued by top management defections, service complaints and an uncertain corporate direction, Wang has appeared to falter in making the transition from word processing pioneer to full-service data processing vendor.

"We see a real mixed feeling about Wang in its installed base," said Tim Caffrey, a minicomputer analyst with Framingham, Mass.-based International Data Corp. "The need to cut the work force again shows that Wang's long-term inability to improve sales and service is having some impact. A lot of people are just fed up, and in this type of economy that hurts significantly."

Wang Chairman and President An Wang announced separately last week that the company will report a small profit for the fourth quarter ended June 30. The forecast represented a slight improvement from the break-even results Wang projected last month, when the company said it was planning to cut additional jobs. [CW, June 30].

See WANG page 132

## IBM, Cybernex dispute settled

By Alan Alper

ARMONK, N.Y. — Continuing its aggressive litigation strategy to protect proprietary technology, IBM last week reached an out-of-court settlement with a small disk drive and recording head vendor accused of using IBM trade secrets.

Cybernex Corp. of San Jose, Calif., founded in 1981 by five former IBM employees, agreed to pay an undisclosed multimillion dollar sum to IBM. Cybernex also agreed to several other provisions, including the destruction of inventories that utilized the allegedly infringing thin-film head technology.

In the past three years, IBM has threatened to sue or actually sued a number of companies that it contended misappropriated its technology, including Hitachi Ltd. of Japan.

Separately, Cybernex agreed last week to merge its recording head operation with competitor Read-Rite Corp. of Milpitas, Calif., and also to acquire controlling inter-

See IBM page 109

## AST reduces staff by 7%, schedules release of products

By Peggy Watt

IRVINE, Calif. — On the verge of releasing a host of new desktop publishing products, AST Research, Inc. announced last week that it laid off 7% of its work force.

The reduction in force, which eliminated 65 positions immediately, was implemented in response to an expected revenue drop in the fiscal year that ended in June, said Jim Ashbrook, vice-president of AST's recently formed personal workstation enhancements group.

Ashbrook said it was too early to count on offsetting the decline with new business from the upcoming product releases. "We're trying to balance our resources for our new ventures," he said.

While AST expects eventually to add positions to its new areas of development, including its communications and systems groups and units for Apple Computer, Inc. and Digital Equipment Corp. products, the

See AST page 132



INDUSTRY INSIGHT  
Edward Warner

## Old countries, new markets

When IBM, Digital Equipment Corp. and other heavyweights of the U.S. computer industry release their quarterly earnings reports this week and next, the reports will likely show international sales contributing more than ever to revenues — and European sales will be found leading the pack.

Europe is a hot market for U.S. vendors because of the dollar's decline in value against European currencies. In addition, analysts say the European computer market's growth has continued largely unabated throughout the duration of the U.S. computer industry slump.

According to Philip DeMarcillac, European research manager for the London office of International Data Corp., the dollar value of the European computer market grew 14% last year. If the dollar drops in value by an additional 5% against the majority of European currencies, he says, U.S. vendors will see 20% to 25% growth in their European markets this year.

What causes the European market to perk, while the U.S. market remains relatively tepid? A simple explanation, according to Susan P. Douglas, New York University professor of marketing and international business, is that the "economies in most major European countries are on the upswing at the moment."

That upswing has been reflected in capital spending, she says, a point echoed by David Altman, an investment analyst with Goldman Sachs & Co. As Altman explains it, "European capital spending has a longer term horizon than it does in the U.S."

In addition, the impact of an economic event often takes longer to be reflected in the buying patterns of European

See OLD page 109

Warner is editor of the Computerworld News Service.

## KEY/MASTER IS IN FRONT OF SOME OF THE BEST

KEY/MASTER is the on-line software used by many companies to capture, verify and transfer data to the best applications software packages in the world. They have chosen software from companies with a proven record of performance, the specialized capabilities, facilities and customer support required for critical applications: accounting, human resources, manufacturing and information center software. And for their data entry requirements, these companies have turned to KEY/MASTER from TSI International, a recognized leader

in on-line technology.

KEY/MASTER offers the security, control and 100% data validation needed in supporting an organizations' information system. Because KEY/MASTER simplifies your entire data entry function, operator productivity increases and end users can simply and quickly build, test and implement fully documented applications — without programming.

KEY/MASTER has been selected as the data entry system by more IBM mainframe sites than any other software pack-

age. And, KEY/MASTER's new PC Option allows data entry on a PC, under the control and security of KEY/MASTER on the mainframe. You can download applications, then upload data to KEY/MASTER on the mainframe — even crossload verified data to other PC software.

When speed, throughput, accuracy and data integrity are vital, KEY/MASTER gives your applications software the data you want, the way you want it — without programming.

Find out for yourself. Contact The Data

Entry Experts at TSI International, 295 Westport Avenue, Norwalk, Connecticut 06856, (203) 846-2101 and ask for your free presentation diskette and the facts about data entry. Or, call our information operators 800-227-3800, x7005.

**TSI**  
TSI International

Advertisement

Advertisement



ALL OF THE TOP COMPUTER MAKERS ALREADY KNOW—

# THE DIFFERENCE BETWEEN HAVING AN EXIDE ELECTRONICS UPS AND NOT HAVING IT IS LIKE DAY AND NIGHT.

Each of the top 10 computer manufacturers uses Exide Electronics Uninterruptible Power Supplies for their power protection. Because they know that not having Exide Electronics' quality of protection can leave their computers in the dark.

Reliability is the biggest reason for choosing Exide Electronics—because you want to know that your UPS will work before you need it to work. But that's not the only reason.

Just look at our Series 1000... from 3 kVA to 10 kVA, no other manufacturer can pack this much power protection into such a small package. In fact, there are thousands of Series 1000 UPS's already installed. You can choose from six different capacities, with multiple voltage options and receptacles. And

each model is about the size of a two-drawer filing cabinet. So it fits nicely into your office or computer room, quietly protecting your power.

These distinguishing features are the result of more than

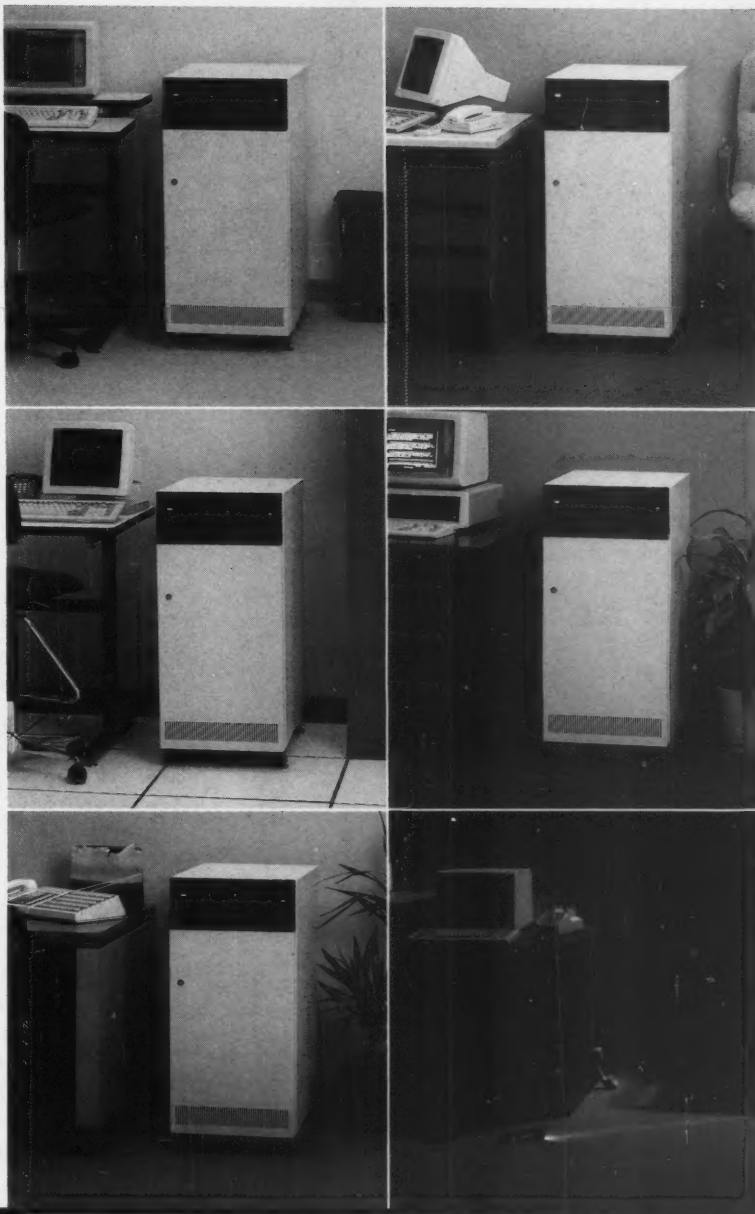
twenty years of power protection leadership. And a commitment to making sure that our products are exactly what we say they are.

*Uninterruptible Power Supplies.*

If you want a UPS you can really depend on, buy it from the company you can really depend on. Exide Electronics. Call us today at 1/800/554-3448. In North Carolina, call 1/800/554-3449.



Series 1000  
Uninterruptible  
Power Systems



Complies with applicable FCC requirements.

## EXIDE ELECTRONICS

P.O. Box 58189, Raleigh, NC 27658, 919/872-3020, TLX 289968  
In Canada, 5200 Dixie Rd., Suite 20, Mississauga, Ontario L4W 1E4







## MSA PERSONNEL SOFTWARE CAN HELP KEEP A COMPANY RUNNING, INSTEAD OF WALKING.

Now your computer can tell you any problem your employees have before they do. Because Management Science America, Inc. has developed a personnel software system that lets you take care of their problem before they decide to take care of it themselves.

Besides tracking your workers' time, attendance, and seniority, the system monitors grievances, dis-

ciplinary actions, and problems reported by each of your employees.

It even helps you strike a cost effective agreement with a union, before a union can threaten a costly strike against you.

And besides helping company management talk to labor, our software will help your software packages talk to one another.

With INFORMATION EXPERT.™ It's a system that integrates all of your software using a language you already know. English.

But before you can open lines of communication within your company, you have to open them up with us. Call Robert Carpenter at 404-239-2000.

After all, who would you rather talk to, a software expert or a labor negotiator?

**MSA SOFTWARE**  
INTELLIGENCE OF A HIGHER ORDER.™



